SIEMENS

SIMATIC NET
Operating Instructions

SCALANCE W744-1PRO
(Client Module)

Preface, Contents

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C79000-G8976-C185-03

Release 01/2005

Classification of Safety-Related Notices

This document contains notices which you should observe to ensure your own personal safety, as well as to protect the product and connected equipment. These notices are highlighted in the manual by a warning triangle and are marked as follows according to the level of danger:

Danger

indicates that death or severe personal injury **will** result if proper precautions are not taken.

Warning

indicates that death or severe personal injury **can** result if proper precautions are not taken.

Caution

with a warning triangle indicates that minor personal injury can result if proper precautions are not taken.

Caution

without a warning triangle indicates that damage to property can result if proper precautions are not taken.

Notice

indicates that an undesirable result or status can occur if the relevant notice is ignored.

Note

highlights important information on the product, using the product, or part of the documentation that is of particular importance and that will be of benefit to the user.

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Disclaimer

We have checked the contents of this manual for agreement with the hardware and software described. Since deviations cannot be precluded entirely, we cannot guarantee full agreement. However, the data in this manual are reviewed regularly and any necessary corrections included in subsequent editions. Suggestions for improvement are welcomed.

C79000-G8976-C185-03
Technical data subject to change.

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Safety Instructions Regarding your Product

Before you use the product described here, read the safety instructions below thoroughly.

Qualified Personnel

Only qualified personnel should be allowed to install and work on this equipment. Qualified persons are defined as persons who are authorized to commission, to ground, and to tag circuits, equipment, and systems in accordance with established safety practices and standards.

Correct Usage of Hardware Products

Please note the following regarding the correct usage of hardware products:

Caution

This device may only be used for the applications described in the catalog or the technical description, and only in connection with devices or components from other manufacturers which have been approved or recommended by Siemens.

This product can only function correctly and safely if it is transported, stored, set up, and installed correctly, and operated and maintained as recommended.

Before you use the supplied sample programs or programs you have written yourself, make certain that no injury to persons nor damage to equipment can result in your plant or process.

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Please note the following regarding the correct usage of software products:

Caution

This software may only be used for the applications described in the catalog or the technical description, and only in connection with software products, devices, or components from other manufacturers which have been approved or recommended by Siemens.

Before you use the supplied sample programs or programs you have written yourself, make certain that no injury to persons nor damage to equipment can result in your plant or process.

Prior to Startup

Before putting the product into operation, note the following warning:

Caution

Prior to startup you must observe the instructions in the relevant documentation. For ordering data of the documentation please refer to the catalogs or contact your local SIEMENS representative.

Preface

Scope of this Manual

This manual describes the products SCALANCE W744-1PRO. This manual applies to the following software versions:

- SCALANCE W744 firmware as of Version 1.0
- Primary Setup Tool as of Version 2.0.10

Purpose of the Manual

This manual is intended to provide you with the information you require to install, commission and operate the SCALANCE W744 correctly. It explains how to configure the SCALANCE W744 and how to integrate the SCALANCE W744 in a WLAN network.

Orientation in the Documentation

Apart from the operating instructions you are currently reading, the following documentation is also available from SIMATIC NET on the topic of Industrial Wireless LANs:

- **Operating Instructions (compact) SCALANCE W744-1PRO**
  This document is supplied on paper with the device and contains an abridged version of the most important information required to work with the SCALANCE W744.

- **System Manual Wireless LAN Basics**
  This includes not only the description of the physical basics and an outline of the most important IEEE standards but also information on data security and a description of industrial uses of wireless LAN.
  You should read this manual if you want to set up WLAN networks with a more complex structure (not only connections between two devices).

- **Operating Instructions SCALANCE W788-1PRO / SCALANCE W788-2PRO**
  This is the comprehensive user documentation on the SCALANCE W788-1PRO with all the information required for installation, commissioning and operation of this device.
  The SCALANCE W788-1PRO is connected to a PC / PLC by an Ethernet cable and allows the attachment of these devices to a wireless network; in other words, it is a gateway from a wired to a wireless network.

- **Operating Instructions (compact) SCALANCE W788-1PRO**
  This document is supplied on paper with the device and contains an abridged version of the most important information required to work with the SCALANCE W788-1PRO.

- **Operating Instructions CP 7515**
  The comprehensive user documentation for the CP 7515 communications processor with all the information required to operate this device.
  The CP 7515 is inserted in a CardBus / PC-card (32-bit) slot and allows attachment of the PC/PG to a wireless network.

- **Operating Instructions (compact) CP 7515**
  This document is supplied with the device on paper and contains a concise summary of the most important information required to use the CP 7515.

- **Manual CP 1515**
  The comprehensive user documentation for the CP 1515 communications processor with all the information required to operate this device.
  The CP 1515 is inserted in a PC-card slot (Type II) and allows attachment of the PC/PG to a wireless network.

Biological Compatibility

With regard to the question of whether electromagnetic fields (for example in association with industrial wireless LANs) can put human health at risk, we refer to a publication of BITKOM (German Association for information Technology, Telecommunication and New Media e. V) dated December 2003:

> "The same regulations for the protection of health for all other radio applications also apply to WLAN devices. These regulations are based on the protection concept of ICNIRP[2] or the corresponding recommendation of the European Council.
>
> The independent German radiation protection commission (SSK) was commissioned by the federal German ministry of the environment to investigate the possible dangers - thermal and non-thermal - resulting from electromagnetic fields and came to the following conclusions[3]:
>
> *"The SSK comes to the conclusion that even after evaluation of the latest scientific literature, there is no new scientific evidence regarding proven adverse effects on health that causes any doubt regarding the scientific evaluation on which the protection concept of the ICNIRP or the European Council recommendation is based."*
>
> The SSK also concludes that below the current limit values, there is also no scientific suspicion of health risks.
>
> This evaluation agrees with that of other national and international scientific commissions and with that of the WHO (www.who.int/emf).
>
> [...]
>
> ---
>
> [...]
>
> [2] International Council on Non-Ionizing Radiation Protection
>
> [3] Limit Values and Precautionary Measures to Protect the General Public from Electromagnetic Fields, Issue 29, 2001.

You will find further information on this topic under the following URL:

www.bitkom.org

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Basic Information on Wireless LAN Communication

1

1.1 Network Structure

Typical Configuration with the SCALANCE W744

A typical use of the SCALANCE W744 is to integrate wired Ethernet devices (for example SIMATIC S7-PLCs) in a wireless network.

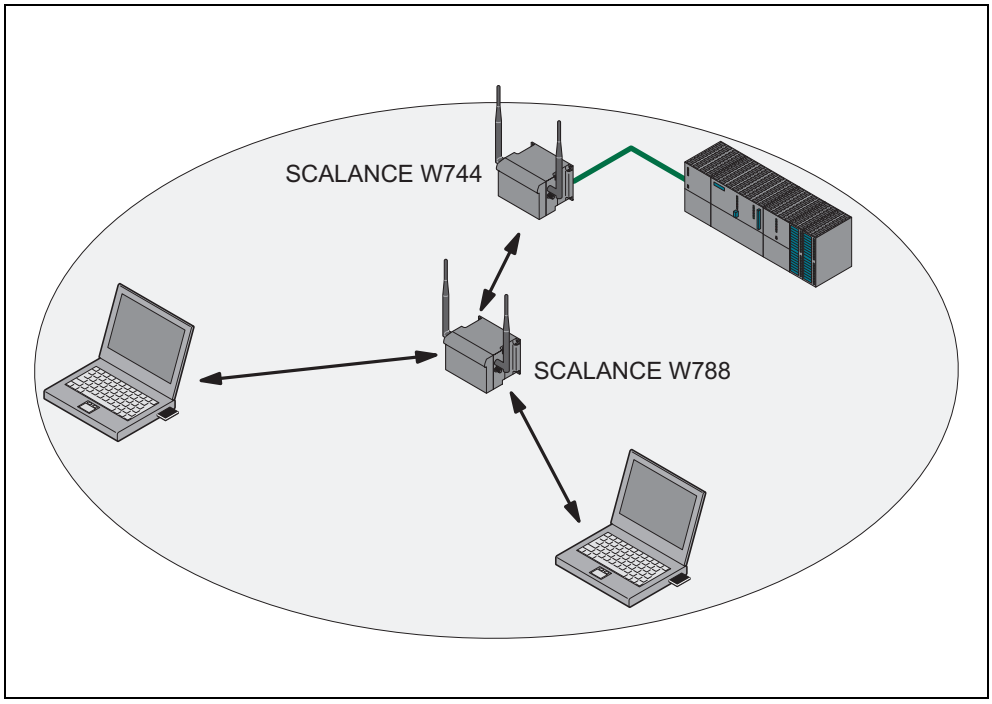


Figure 1-1 Interfacing a SIMATIC S7-PLC to a Wireless LAN with a SCALANCE W744.

Description of the SCALANCE W744 2

Components of the Product

The following components are supplied with the SCALANCE W744:

- SCALANCE W744-1PRO
- 2 OMNI antennas
- 1 IE IP67hybrid connector
- 1 dummy plug for the M12 socket
- 2 dummy plugs for the R-SMA sockets
- 1 SIMATIC NET Industrial Wireless LAN CD with these Operating Instructions for the SCALANCE W744

Please check that the consignment you have received is complete. If it is not complete, please contact your supplier or your local Siemens office.

Requirements for Installation and Operation

To configure the SCALANCE W744, a PG/PC with network attachment must be available. If no DHCP server is available, a PC on which the Primary Setup Tool (PST) is installed is necessary for the initial assignment of an IP address to the SCALANCE W744. For the other configuration settings, a computer with Telnet or an Internet browser is necessary.

Possible Applications of the SCALANCE W744

The SCALANCE W744 is equipped with an Ethernet interface and a wireless LAN interface (SCALANCE W744-2PRO: two WLAN interfaces). This makes the device suitable for the following applications:

- The SCALANCE W744 can be used as a connection between a device with ethernet interface (i. e. SIMATIC PLC with industrial ethernet communication processor) and a wireless network.
- The SCALANCE W744 can be used as a gateway from a wired to a wireless network. One node is supported in the wired network.

Properties of the SCALANCE W744

- The Ethernet interface supports 10 Mbps and 100 Mbps, both in full and half duplex as well as autocrossing and autonegotiation.
- The wireless interface is compatible with the IEEE 802.11a, IEEE 802.11b, and IEEE 802.11g standards. In the 802.1a- and 802.1g mode, the total transmission rate is up to 54 Mbps. In the turbo mode, the transmission rate is up to 108 Mbps (not permitted in all countries and modes).
- Operation in the 2.4 GHz and 5 GHz frequency bands.
- Support of the authentication standards WPA, WPA-PSK and IEEE 802.1x and WEP, AES and TKIP encryption schemes.
- Suitable for inclusion of a RADIUS server for authentication.
- The interoperability of SCALANCE W744 devices with WiFi devices of other vendors was tested thoroughly.

Ports

The SCALANCE W744 has the following ports:

- RJ45 hybrid connector on the front panel of the housing consisting of an RJ-45 jack and 4-pin power socket. The RJ-45 connector supports the use of switches capable of power-over-Ethernet according to 802.3af. The 4-pin power socket allows power of 24-48 VDC to be supplied.
- An M12 connector as optional power supply.(24-48 VDC)
- Two R-SMA plugs (four R-SMA plugs on the SCALANCE W744-2PRO) for the attachment of antennas on the sides of the device.

LED Display

On the front of the housing, several LEDs provide information on the operating status of the SCALANCE W744:

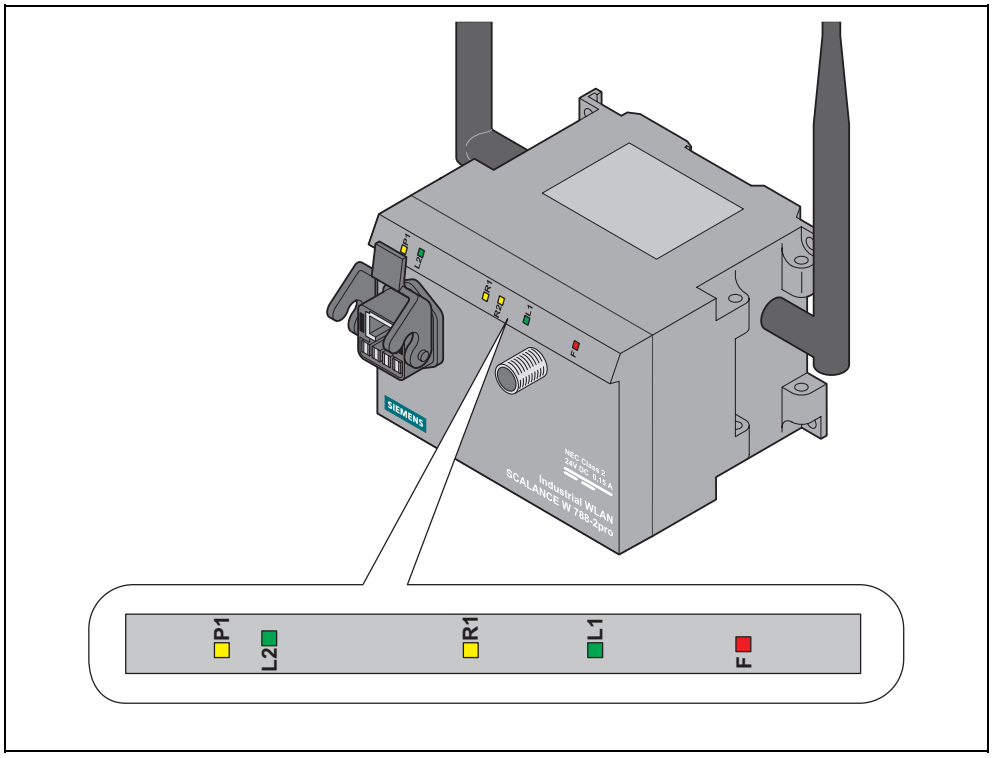


Figure 2-1 The LEDs of the SCALANCE W744

The LEDs have the following significance:

LED	Color	Meaning
P1	Yellow	Data transfer over the Ethernet interface (traffic).
	Green	There is a connection over the Ethernet interface. (Link)
L2	Green	Power supply over hybrid connector X1. (PoE or power contacts)
R1	Yellow	Data transfer over the WLAN interface.
	Green	There is a connection over the WLAN interface to an AP or ad hoc network.
	Green flashing	The client is searching for a connection to an access point or ad hoc network.
	Green flashing quickly	The client is waiting for the adopt MAC address. Only in Auto Adopt mode.
L1	Green	Power supply over the M12 connector. (X2)
F	Red	An error occurred during operation with the SCALANCE W744.

Notice

If the LED for the WLAN interface does not light up green during startup although it is activated, then initialization of the interface was unsuccessful.

This can occur, in particular, when the operating temperature has not yet been reached. If the SCALANCE W 700 products are started up in negative temperatures, waiting times of up to 15 minutes are possible.

Configuration Information on the C-PLUG

The C-PLUG is used to transfer the configuration of the old device to the new device when a device is replaced. When the new device starts up, it continues with exactly the same configuration as the old device. One exception to this can be the IP configuration if it is set over DHCP and the DHCP server has not been reconfigured accordingly.

Replacing the C-PLUG

Follow the steps below to replace a C-PLUG in a SCALANCE W744:

1. Remove the old SCALANCE W744 from its mounting and open the sealing screw on the rear with a coin or broad screwdriver.
2. Remove the C-PLUG.
3. Open the sealing screw of the new device in the same way and insert the C-PLUG of the old device.
4. Replace the sealing screws of both devices.

If a new C-PLUG is inserted in a SCALANCE W744-1PRO, the configuration stored locally on the SCALANCE W744-1PRO is saved to the C-PLUG. If an incorrect C-PLUG (for example from another device or a damaged plug) is inserted, the SCALANCE W744 signals an error with the red LED. The user then has the choice of either removing the C-PLUG again or selecting the option to reformat the C-PLUG and use it.

Reset Button

The reset button is located directly beside the C-PLUG and has several functions:

- **Restarting the device.**
  To restart the device, press the Reset button.

- **Downloading new firmware**
  (if the normal procedure for downloading firmware does not work)
  Follow the steps below to download new firmware:

  1. Turn off the power to the device.
  2. Now press the Reset button and reconnect the power to the device while holding down the button.
  3. Hold down the button until the red fault LED (F) starts to flash after approximately 2 seconds.
  4. Now release the button. The bootloader waits in this state for a new firmware file that you can download by FTP.
  5. Assign an IP address with the Primary Setup Tool.
  6. Connect a PC to the SCALANCE W744 over the Ethernet interface.
  7. Assign an IP address with the Primary Setup Tool.
  8. Then enter the command "ftp <ip address>“ in a DOS box or use a different FTP client. The new firmware should be located in the same folder as the DOS box.
  9. For the login and password, enter "siemens“. You can now transfer the new firmware with the "put <firmware>“ command.

- **Restoring the default parameters (factory default)**
  Caution: All previously made settings are lost!
  First, turn off the power to the device. Then press the Reset button and reconnect the power to the device while holding down the button. Hold down the button until the red fault LED (F) stops flashing after approximately 10 seconds and is permanently lit. **Now release the button and wait until the error LED (F) goes off. The device now starts automatically with the default parameters.**

Commissioning 3

3.1 Lightning Protection, Power Supply and Grounding

Notes on Lightning Protection

Warning

Antennas installed outdoors must be within the area covered by a lightning protection system. Make sure that all conducting systems entering from outdoors can be protected by a lightning protection potential equalization system.

When implementing your lightning protection concept, make sure you adhere to the VDE 0182 or IEC 62305 standard.

A suitable lightning conductor is available in the range of accessories of SIMATIC NET Industrial WLAN:

Lightning Protector LP798-1PRO (order no. 6GK5798-1LP00-0AA6)

Notes on Power Supply and Grounding

Warning

The SCALANCE W744-1PRO device is designed for operation with safety extra-low voltage (SELV). This means that only safety extra-low voltages (SELV) with limited power source (LPS) complying with IEC950/EN60950/ VDE0805 can be connected to the power supply terminals.

The power supply unit to supply the SCALANCE W744 must comply with NEC Class 2 (voltage range 18 - 32 V, current requirement 1 A)

The subject unit is to be supplied by a Class 2 power source complying with the requirements of the National Electrical Code, table 11 (b). If power is redundant supplied (two individual power sources) the power sources together should comply with the requirements of the National Electrical Code, table 11 (b).

Exceptions:

Power supply with PELV (according to VDE 0100-410) is also possible if the generated rated voltage does not exceed the voltage limits 25 V AC or 60 V DC.

Power supply by a SELV power source (according to IEC 60950) or PELV power source (according to VDE 0100-410) without limited power is also permitted if suitable fire protection measures are taken by:

- Installation in a cabinet or suitable enclosure
- Installation is a suitably equipped, closed room

Caution

There must be no potential difference between the following parts, otherwise there is a risk that the device could be destroyed:

- Ground potential of the power supply and the ground potential of the antenna ground.
- Ground potential of the power supply and a grounded enclosure.
- Ground potential of the power supply and the ground potential of the device connected to Industrial Ethernet (for example, PC, AS-300, AS-400 etc.).

Connect both grounds to the same foundation earth or use an equipotential bonding conductor.

3.2 Assembly and Connectors

Securing the Housing

There are two ways of securing the housing:

- Use the holes in the housing to screw the device to the wall or on a horizontal surface.
- Install the SCALANCE W788 on a 90 mm long, vertically mounted piece of standard rail (S7-300). In this case, the standard rail serves as an adapter between the wall and SCALANCE W788. If you want to install the SCALANCE W788 along with a PS791-1PRO, a 150 mm long standard rail is necessary.

Connectors for the Power Supply and for Ethernet

The SCALANCE W788 is attached to Ethernet via a hybrid socket on the front of the housing (position **A** in Figure 3.1). This port also has contacts for the operating voltage.

Note

If you do not use the hybrid socket, this must be covered with a protective cap, otherwise IP65 protection is lost. A suitable protective cap is available as an accessory. If you do not use the M12 connector, the supplied protective cap must be fitted to retain IP65 protection.

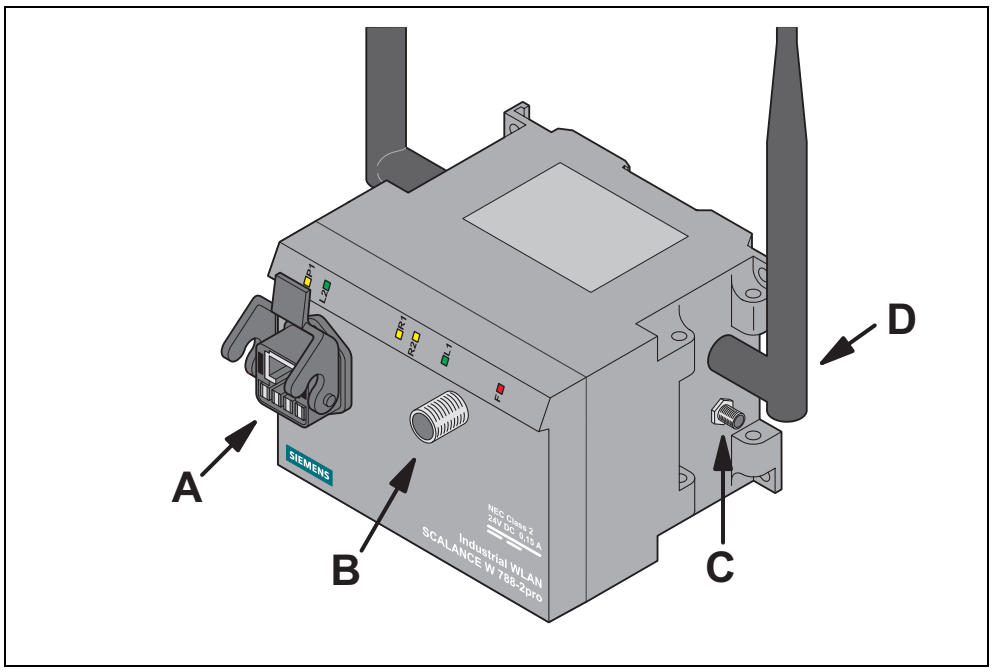


Figure 3-1 Connectors of the SCALANCE W744

As an alternative or in addition to this, you can also use the M12 plug for the power supply (position **B** in Figure 3.1).

You can screw the supplied antennas onto the R-SMA connectors on the sides of the housing (position **C** in Figure 3.1). As an alternative you can use separate antennas installed at a distance from the device.

3.3 Cabling for Power Supply and Ethernet

3.3.1 General Notes

Suitable Cables

The following cable variants are available to connect a SCALANCE W-700 to the power supply and to Ethernet:

- IE hybrid cable 2x2 + 4x0,34 (order no. 6XV1870-2J)

  The two data wire pairs are separately shielded. This cable is particularly suitable for assembly with the IE IP67 hybrid connector.

- IE FC TP standard cable 4x2 GP (order no. 6XV1870-2E)
  IE FC TP flexible cable 4x2 GP (order no. 6XV1870-2H)

  In these cable types, two wires are twisted. All for pairs of wires are inside a common shield.

Cable Selection and Interference Exposure

A decisive factor in the selection of a cable type is the electromagnetic interference to which the current lines between the power supply and the FC RJ-45 modular outlet are subjected. Due to the separate shielding of the data wires, such interference has less effect on the data transmission on a hybrid cable than on TP standard cable or TP flexible cable.

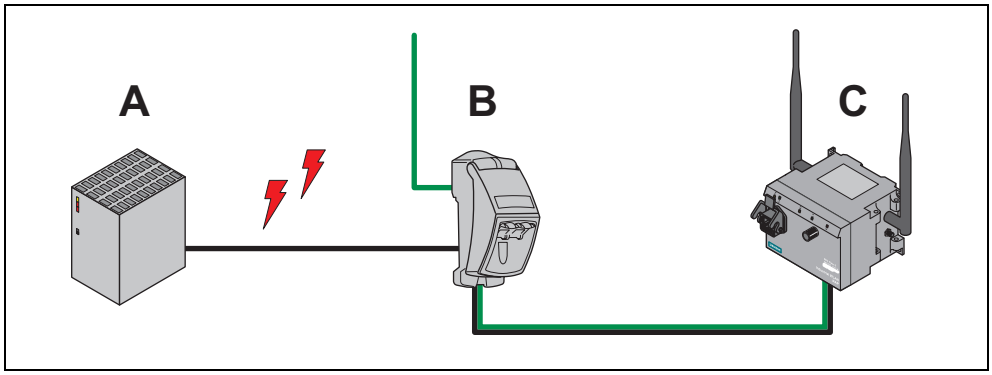
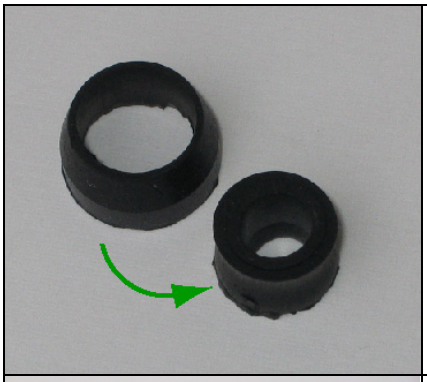
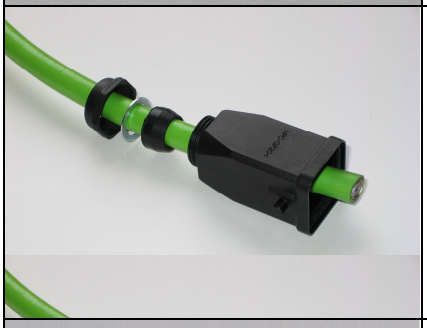
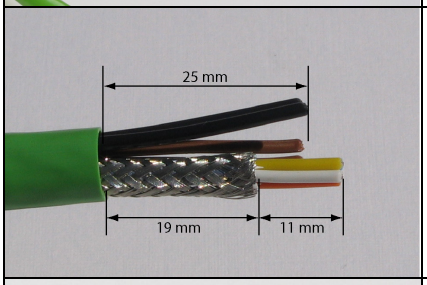
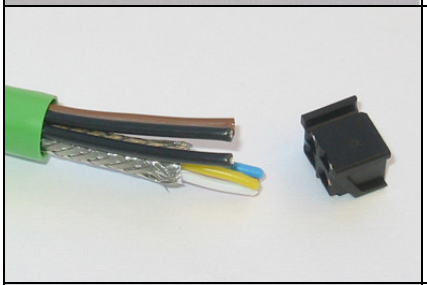
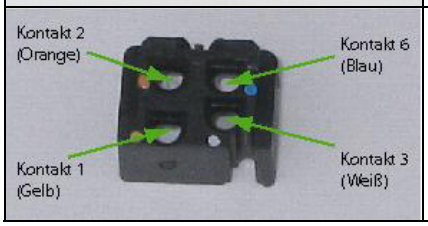


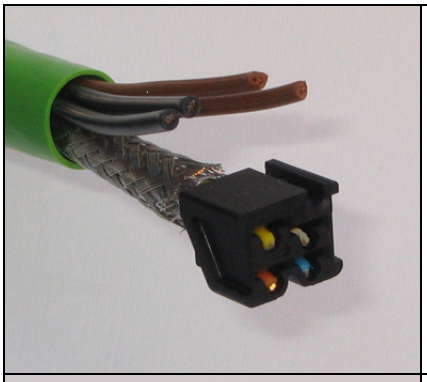
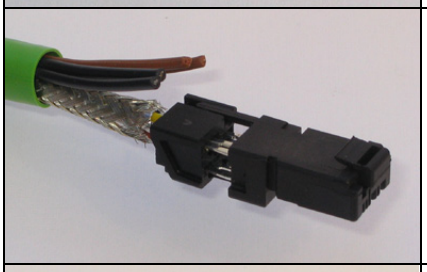
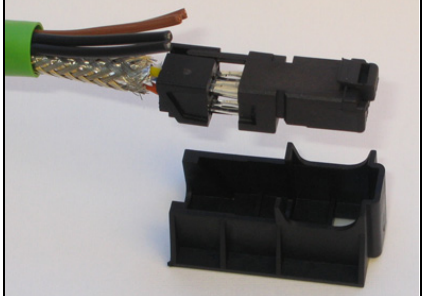
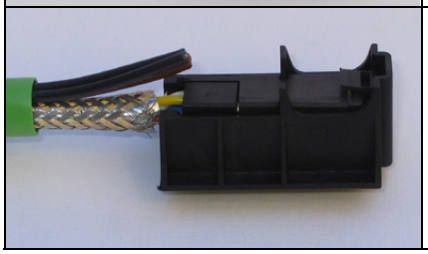
Figure 3-2 Cabling a SCALANCE W700 with electromagnetic interference injection between the power supply and modular outlet

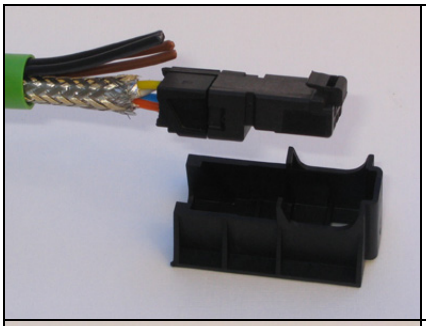
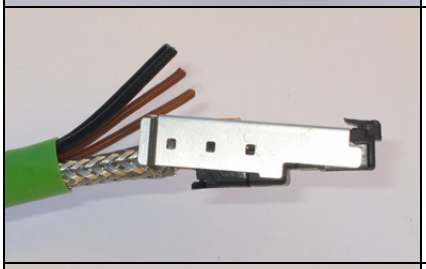
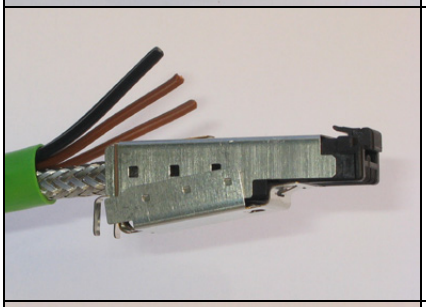
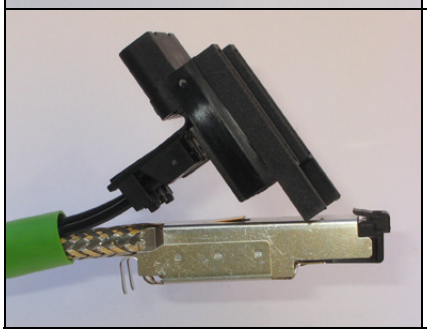
A Power supply
B FC RJ-45 modular outlet with power insert
C SCALANCE 788 / 744

3.3.2 Assembling IE Hybrid Cable 2x2 + 4x0,34 with an IE IP67 Hybrid Connector

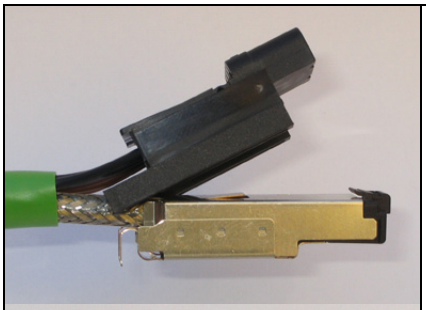
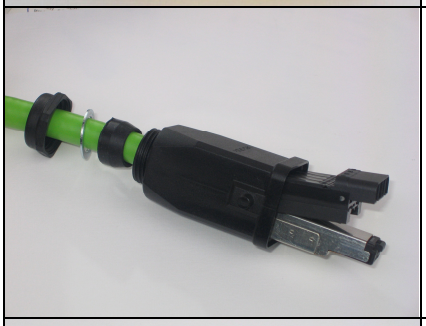
	Remove the two inner shells of the universal sealing ring to adapt it to the diameter of the hybrid cable.
	Push the bushing, washer, adapted universal sealing ring and the housing over the cable jacket.
	Remove the following lengths of cable jacket and shield braid: 25 mm for the power leads. 30 mm jacket for the data leads (shorten the braid by 11 mm). Cut off the filler at the height of the cable jacket.
	Arrange the data leads according to the color codes on the splice element. The following table shows the assignment of the data leads.
	Contact and color assignment of the splice element.

Wire color code (standard)	**white**	**Blue**	**Yellow**	**Orange**
Connector color code (Siemens IE)	White	Blue	Yellow	Orange
Siemens IE FC RJ-45 socket (reference)	3	6	1	2

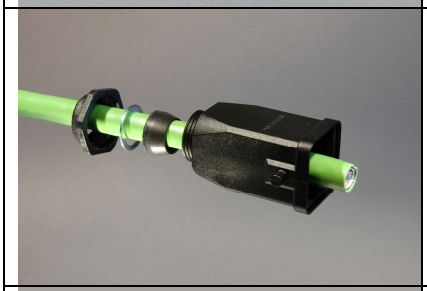
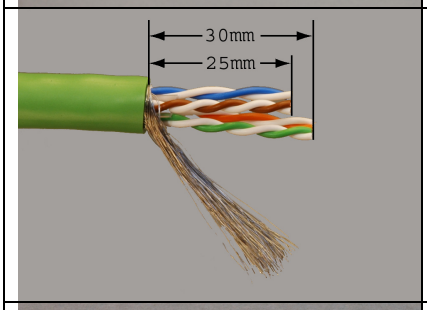
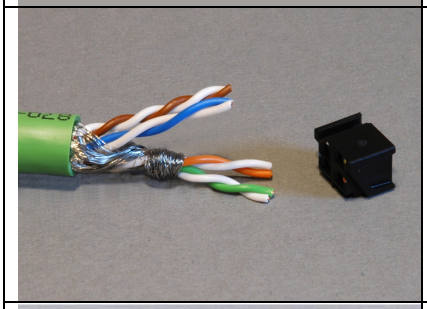
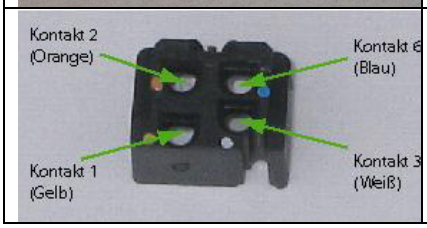
	Insert the all the data leads at the same time into the spice element is far as they will go.
	Close the splice element and RJ-45 data module until they lock together.
	Insert the data module and the spice element into the supplied IDC assembly tool.
	Press the data module and the IDC assembly tool together to establish the installation piercing connection.

	Remove the assembled data module from the IDC assembly tool.
	Position the top shield plate and press it over the cable shield.
	Position the lower shield place and press it and the upper shield plate together until they lock together with an audible "click".
	Arrange the power leads and insert them as far as they will go into the hinge elements of the isolation body. The following table shows the assignment of the power leads.

Wire color code (standard)	**Brown**	**Brown**	**Black**	**Black**
	24 V	24 V	Ground	Ground
Power supply insert module	1	2	3	4

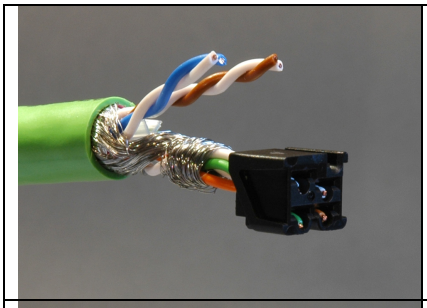
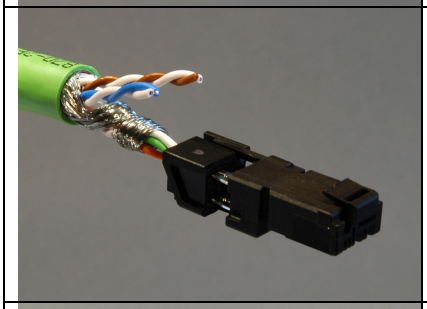
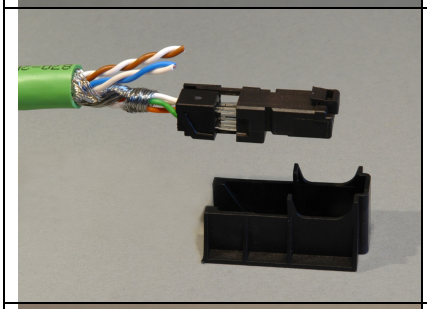
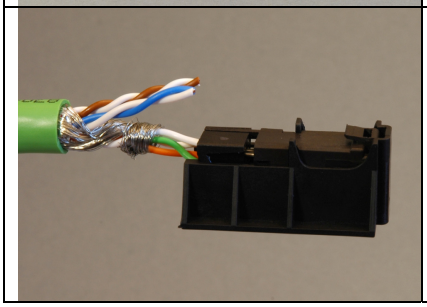
	Press each individual hinge element together with the integrated IDC contact. Recommendation: Use a small slotted screwdriver (max. 3.5 mm) as a lever.
	Push the housing over the assembled data module and the insulator body until they lock together (there should be an audible click).
	Tighten the cable gland. We recommend an open ring key with a size of 21 mm.

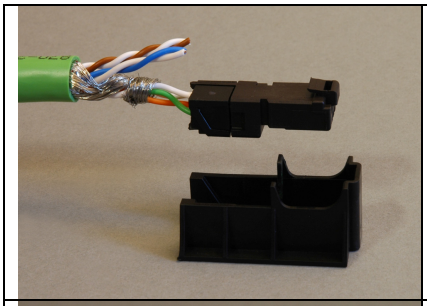
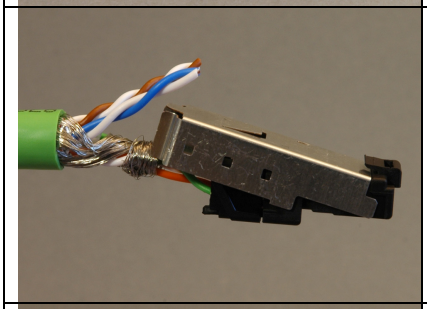
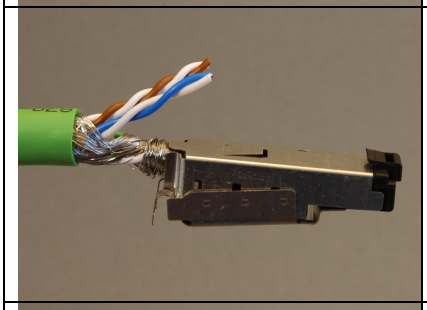
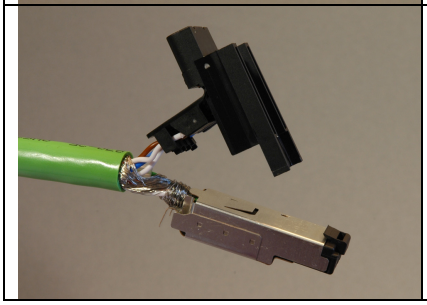
3.3.3 Assembling IE FC TP Standard Cable 4x2 GP or IE FC TP Flexible Cable 4x2 GP with an IE IP67 Hybrid Connector

	Remove the two inner shells of the universal sealing ring to adapt it to the diameter of the hybrid cable.
	Push the bushing, washer, adapted universal sealing ring and the housing over the cable jacket.
	Remove the following lengths of cable jacket and shield braid: 25 mm for the power leads. 30 mm for the data leads (to achieve good shielding, the shield braid should be at least 30 mm long).
	Arrange the data leads according to the color codes on the splice element. The following table shows the assignment of the data leads. Wind the shield braid around the data leads. As a result, the shielding of the cable has contact to the shield plate of the splice element that will be fitted later.
	Contact and color assignment of the splice element.

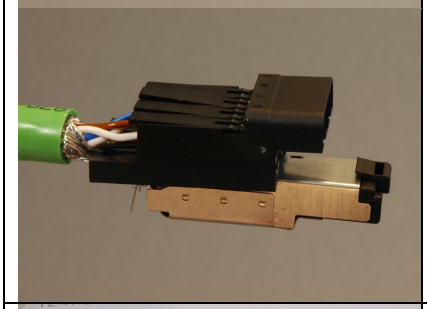
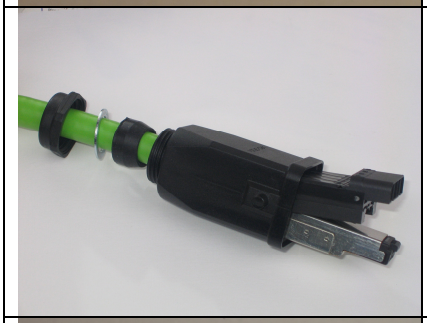
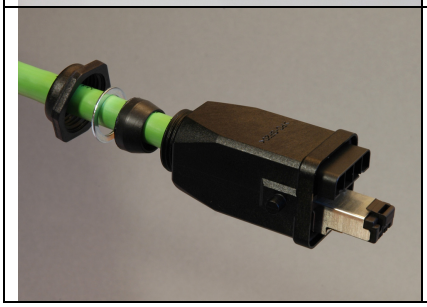
Color Coding of the Standard Cable	White / orange *	Orange	White / Green *	Green
Connector color code (Siemens IE)	White	Blue	Yellow	Orange
Siemens IE FC RJ-45 socket (reference)	3	6	1	2

* White wire of the particular pair.

	Insert the all the data leads at the same time into the spice element is far as they will go.
	Close the splice element and RJ-45 data module until they lock together.
	Insert the data module and the spice element into the supplied IDC assembly tool.
	Press the data module and the IDC assembly tool together to establish the installation piercing connection.

	Remove the assembled data module from the IDC assembly tool.
	Position the top shield plate and press it over the cable shield.
	Position the lower shield place and press it and the upper shield plate together until they lock together with an audible "click".
	Arrange the power leads and insert them as far as they will go into the hinge elements of the isolation body. The following table shows the assignment of the power leads.

Wire color code (standard)	White / Blue *	Blue	White brown *	Brown
	24 V	24 V	Ground	Ground
Power supply insert module	1	2	3	4

	Press each individual hinge element together with the integrated IDC contact. Recommendation: Use a small slotted screwdriver (max. 3.5 mm) as a lever.
	Push the housing over the assembled data module and the insulator body until they lock together (there should be an audible click).
	Tighten the cable gland. We recommend an open ring key with a size of 21 mm.

3.3.4 Pinout of the M12 Connector

	X2 Socket
PIN 1	24 V DC
PIN 2	--
PIN 3	Ground
PIN 4	--

Configuration with the Primary Setup Tool 4

4.1 Introduction

Initial Assignment of an IP Address

An initial IP address for the SCALANCE W744 cannot be assigned using Web Based Management or the Command Line Interface because these configuration tools require that an IP address already exists.

The initial IP address can be obtained only over DHCP or assigned using the Primary Setup Tool. The Primary Setup Tool is capable of assigning such an address to unconfigured devices without an IP address. The only condition is that the devices can be reached over Ethernet.

Operating Systems Supported

The Primary Setup Tool can be installed and used with the following operating systems:

- Windows XP Professional
- Windows 2000 Professional SP2

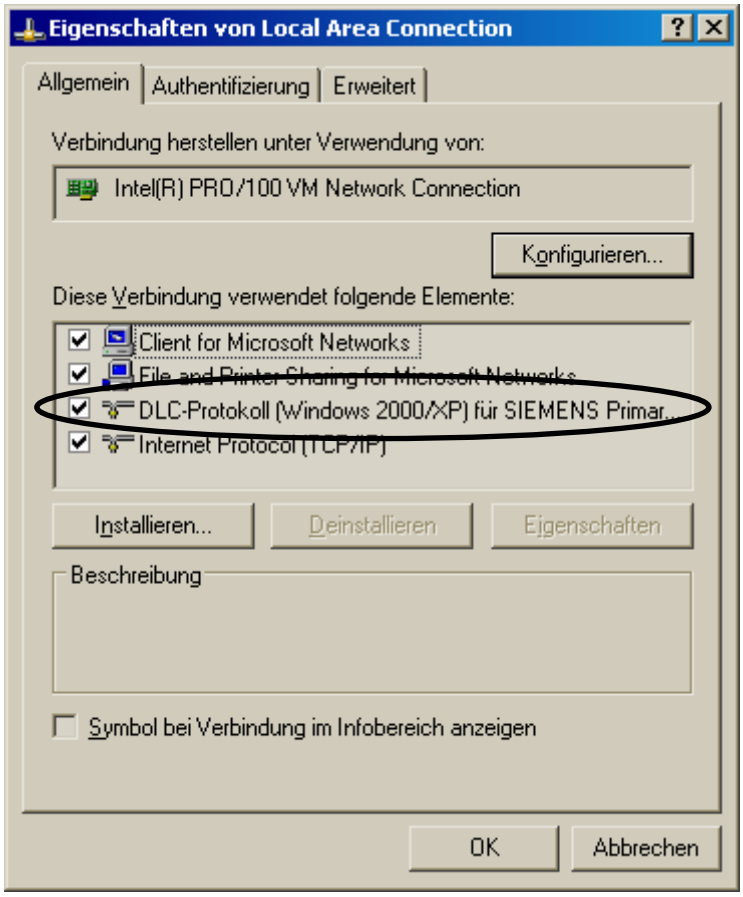
DLC Protocol

The Primary Setup Tool uses the DLC protocol for communication with the modules. This protocol is not supplied with Windows XP and must be installed extra for this operating system.

Follow the steps below to check whether or not the DLC protocol exists on your computer:

1. Select the menu command *Start* > *Settings* > *Control Panel* >*Network and Dial-Up Connections.*
2. Select the connection to your Ethernet communication module.

3. Right-click to open the context menu and select *Properties*. The *General* tab lists all protocols and services. The DLC protocol should be listed and selected:



If the DLC protocol is listed, you can skip to the next but one section "Installing the Primary Setup Tool". If there is no entry for the DLC protocol, install it as described in the next section.

4.2 Installing the DLC Protocol

Extracting the Archive File

The files for installing the DLC protocol are in the self-extracting ZIP archive *pst_xp_install.exe*. Follow the steps below to extract the files from the archive:

1. Double-click on the file name *pst_xp_install.exe* in the Windows Explorer or start the program using the Windows menu command *Start* > *Run*.
2. In the dialog box of the extraction program, select the folder into which you want to extract the files and click on the *Unzip* button.

Installation

Follow the steps below to install the DLC protocol on your computer:

1. Select the menu command *Start* > *Settings* > *Control Panel* >*Network and Dial-Up Connections.*
2. Select the connection to your Ethernet communication module.
3. Right-click to open the context menu and select *Properties*.
4. Click on the *Install...* button in the *General* tab.
5. In the *Select Network Component Type* dialog, select the entry *Protocol* and click the *Add...* button.
6. In the *Network Protocol* dialog, click the *Have Disk...* button.
7. In the *Install from Disk* dialog, click the *Browse...* button.
8. In the file list box, change to the folder with the extracted installation files, select the *netdlc.inf* file and click the *Open* button.
9. In the *Install from Disk* dialog, click *OK*. The protocol is installed; the list box in the properties dialog of the communication module now includes the entry *DLC Protocol (Windows 2000/XP) for Siemens Primary Setup Tool*.
10. Close the properties dialog by clicking the *OK* button.

4.3 Installing the Primary Setup Tool

Procedure

The files of the Primary Setup Tools are in the self-extracting ZIP archive *pst_install.exe*. Follow the steps below to install the files of the archive:

1. Double-click on the file name *pst_install.exe* in the Windows Explorer or start the program using the Windows menu command *Start* > *Run*.

2. In the dialog box of the extraction program, select the folder into which you want to extract the files; the default is *c:\siemens\pst*.

3. Click the *Unzip* button. After extraction, the folder you selected contains several files including *s7wnpstx.exe*. Start the Primary Setup Tool by double-clicking on this file.

4.4 Working with the Primary Setup Tool

Selecting the Language

After starting the Primary Setup Tool, a dialog opens in which you select the language for the program. You can also set the language in the *Settings* > *Language* menu.

Selecting the Network Adapter

If there is more than one network adapter in your computer, you can open the *Settings* > *Network Adapter* menu and specify which adapter is used by the Primary Setup Tool. This menu displays a maximum of four network adapters, however only those for which the DLC protocol is activated are shown.

Browsing the Network

Before you assign IP addresses with the PST, you must first locate the configurable devices in the network. Start this search with the steps outlined below:

- Select the *Network* > *Browse* menu command.
- Click on the magnifier icon in the toolbar below the menu bar.

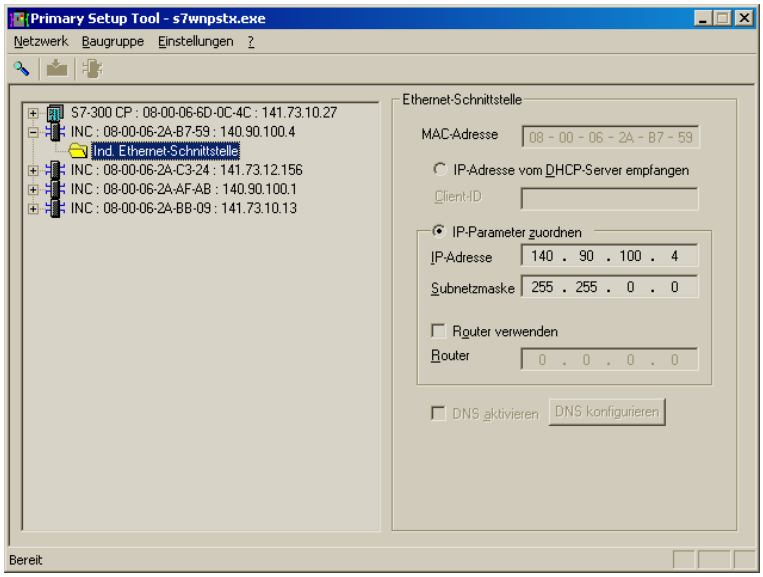
While the Primary Setup Tool browses the network, the *Browse Network* dialog is displayed with a progress bar. On completion of the search, the Primary Setup Tool displays a list with all the devices it has found in the left-hand pane.

Configuring a Module

If you click an entry in the list, the Primary Setup Tool displays information on the selected device in the right-hand pane.

Follow the steps below to configure a device:

1. Click on the plus symbol in front of the device symbol or double-click on the device symbol to display all interfaces of the device.
2. Click on the interface you want to configure. The Primary Setup Tool displays the input dialog for the configuration data in the right-hand pane of the program window. Depending on the selected settings, some text boxes or check boxes may be disabled. The *MAC address* box is always disabled because this address is a property of the device that cannot be modified. The Client ID parameter and DNS is also not supported by the SCALANCE W744.



3. Decide how the device will obtain its IP address:

   - Dynamically from a DHCP server:
     Select the *Obtain IP address from DHCP server* option button.

   - Manual assignment by the user:
     Select the *Assign IP parameters* option button.

4. Make the following entries if you have decided to assign the IP address manually:

   - Enter the IP address for the device in the *IP Address* box. In each part of the address separated by the periods, you can enter a number between 0 and 255; the program does not accept any other numbers.

   - Enter the subnet mask in the *Subnet Mask* box.

   - If necessary, select the *Use router* check box and enter the IP address of the router in the text box. Router information is necessary if the computer on which you are creating the configuration is not in the same subnet as the SCALANCE W744.

Downloading to the Module

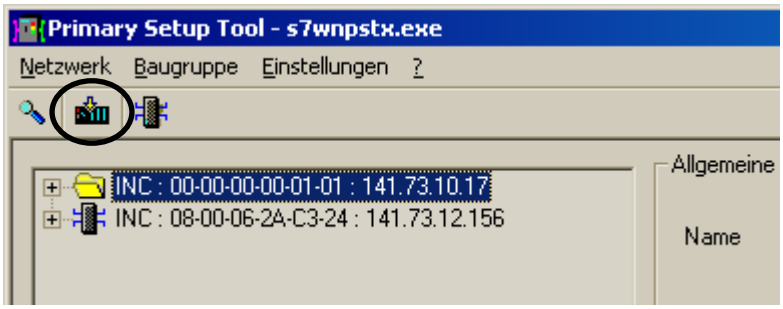
Follow the steps below to transfer the configuration data to the device:

1. Select the module to which you will download the configuration data in the left-hand pane of the program window. As long as an interface is selected and the input dialog for the configuration data is displayed, no download is possible.

2. Start the download with the steps outlined below:

   - Select the *Module* > *Download* menu command.

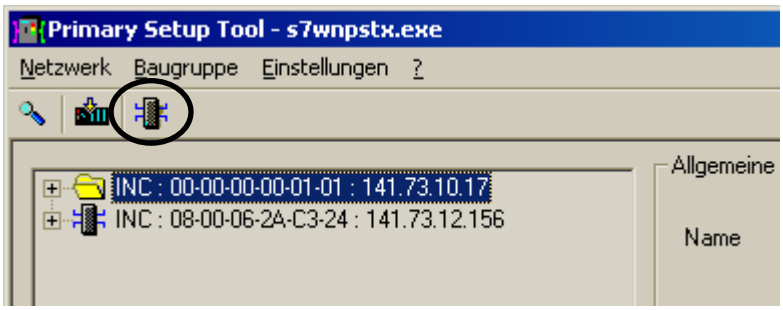
   - Click the second icon from the left in the toolbar (S7 modules with yellow arrow).



Starting Web Based Management

INCs (Industrial Network Components) such as the SCALANCE W744 include Web Based Management. Select the device you want to configure with Web Based Management and follow the steps below to start Web Based Management:

- Select the menu command *Module -> Start INC Browser*.
- Click on the third icon from the left in the toolbar (module with four blue wires).



If the *Module > Start INC Browser* and the module icon are disabled, there is no Web Based Management for the selected module.

Removing a Module

You can remove a module from the list in the left-hand part of the program window by selecting the *Module > Remove Module* menu command. Using this menu command has no effect on the existence of a module in the network; if you browse the network again, all modules are displayed again.

4.5 Primary Setup Tool via the Command Line

Syntax

You can also use the Primary Setup Tool from the command line of a DOS prompt. The syntax is as follows; optional parameters are shown in square brackets:

```
s7wnpstx MAC address -DHCP[=client ID]
s7wnpstx MAC address -RESET
s7wnpstx MAC address IP address subnet mask [router address]
```

The following table explains the parameters:

Command	Description	Comment
MAC address	The MAC address of the module to be configured.	
-DHCP	Specifies that the IP address is obtained from a DHCP server.	
client ID	A unique identifier for the device. If this parameter is not specified, the Primary Setup Tool uses the MAC address as the ID.	Optional.
-RESET	Sets the IP address to 0.0.0.0 .	
IP address	The new IP address of the module to be configured.	
subnet mask	The new subnet mask of the module to be configured.	
Router address	The new IP address of the default router.	Optional.

Configuration Using Web Based Management and the Command Line Interface

5

5.1 General Information on Web Based Management and the Command Line Interface

5.1.1 Introduction

Contents of this Chapter

This chapter explains the possible settings for the SCALANCE W788. For a detailed description of the individual elements of a page, refer to the online help.

As an alternative, you can also configure the device using the Command Line Interface (CLI). This allows remote configuration over Telnet.

This chapter describes both configuration methods together because the menu structure of Web Based Management is the same as the structure of the CLI commands.

Note

You should only use the command line interface if you are an experienced user. Even commands that bring about fundamental changes to the configuration are normally executed without a prompt for confirmation

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Note on User Login

If you log on as user, you will only have restricted use of WEB and Telnet. Since you only have read access, some commands do not exist in Telnet and some areas cannot be selected.

Required Experience

To be able to use the information in this chapter effectively, you should have a thorough knowledge of network technology and WLANs.

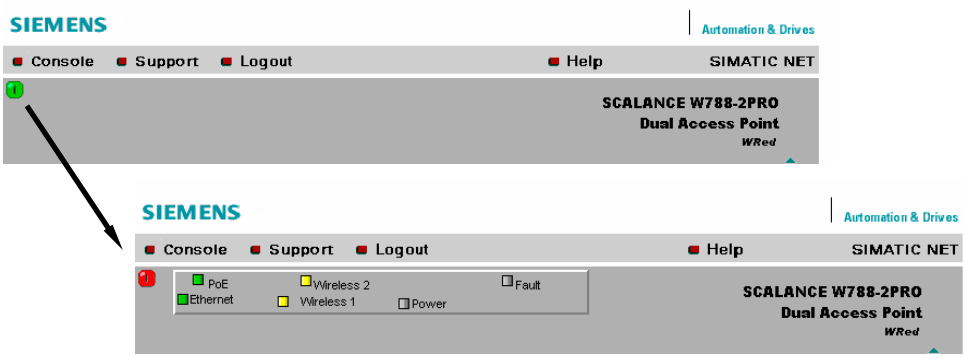
5.1.2 The LED Simulation of Web Based Management

Display of the Operating State

The SCALANCE W744 has one or more LEDs that provide information on the operating state of the device (see Chapter 2). Depending on its location, direct access to the SCALANCE W744 may not always be possible. Web Based Management therefore displays simulated LEDs.

Activating the Simulation

There is an HTML-based simulation of the LED status. Click on the green icon below the *Console* link to activate the simulation:



5.1.3 Working with Web Based Management

Navigation Bar

The upper menu bar of WBM contains the following links:

- Console
  This link opens a console window in which you can enter CLI commands.
- Support
  When you click this link, you open a SIEMENS AG support page.
- Logout
  Close the current Web Based Management session by clicking on this link. The logon dialog is then displayed again.
- Help
  Clicking on this link opens the online help of Web Based Managements in a separate browser window.

Updating the Display with *Refresh*

Web Based Management pages have a *Refresh* button at the lower edge of the page. Click this button to request up-to-date information from the SCALANCE W744.

Saving Entries with *Set Values*

Pages in which you can make configuration settings have a *Set Value* button at the lower edge. Click this button to save the configuration data you have entered on the SCALANCE W744.

Creating entries with *NEW*

Pages in which you can create lists have the *New* button at the lower edge. Click this button to save the configuration data you have entered on the SCALANCE W744.

Recessing Encounter with *Reset Statistics*

With this button, you can reset the relevant counters.

5.1.4 Command Line Interface

Starting the CLI in a Windows Console

Follow the steps outlined below to start the Command Line Interface in a Windows console:

1. Open a Windows console and type in the command *telnet* followed by the IP address of the SCALANCE W744:
   `C:\>telnet <IP address>`
2. Enter your login and password.

As an alternative, you can also enter the command *telnet* followed by the IP address of the SCALANCE W744 in the *Start* > *Execute* menu.

Starting the CLI in Web Based Management

Click on the *Console* entry in the upper menu bar of Web Based Management. A console opens in which you can log on with your login and password. The IP address is adopted by Web Based Management.

Shortcuts for Commands

As an alternative, instead of entering full CLI commands, you can simply enter the first letter or the first few letters of the command and then press the Tab key. The Command Line Interface then displays a command starting with the letter or letters you typed in. If the command displayed is not the command you require, press the Tab key again to display the next command.

Directory Structure

Before you can enter a command in the Command Line Interface, you must first open the required menu or submenu. This section lists the commands of each menu in a separate table. The menu itself is shown above the table on a gray background. The table lists only the commands themselves.

Symbols for Representing CLI Commands

CLI commands generally have one or more parameters that are represented in the syntax description as follows:

- Mandatory parameters are shown in pointed brackets.
  Example: `<IP address>`

- Optional parameters are shown in square brackets.
  Example: `[E|D]`

  If you omit an optional parameter, most commands output the currently set value.

- Alternative input values are separated by the pipe character. In this case, you specify *one* of the listed values as the parameter.
  Example: `[E|D]`
  You must enter either *E* or *D*.

- If a numeric value is required as a mandatory parameter, you can also specify a range of values:
  Example: `<0 ... 255>`
  You must enter a value between 0 and 255.

Cross-menu Commands

You can use the commands in the following table in any menu.

`CLI\ ... >`

Command	Description	Comment
`/`	Moves you one menu level higher.	
`?`	Displays the commands and submenus available in the menu.	
`exit`	Closes the CLI/TELNET session.	Cannot be called using the command shortcuts.
`trace [Mod] [+|-][Level]`	Enables / disables the trace function.	For troubleshooting IQoS, errors, and statistics
`restart`	Restarts the SCALANCE W744	Cannot be called using the command shortcuts.
`info`	Displays information on the current menu item.	

5.2 The System Menu

5.2.1 System Information Menu Command

Mode and Locale Setting

On this page, you make several basic settings for the SCALANCE W744, for example, the country and mode for the device.

Syntax of the Command Line Interface

CLI\SYSTEM>

Command	Description	Comment
country [AT|AU|BE|CA|CH|CL|CZ|DE|DK|ES|FI|FR|GB|GR|HK|HU|IE|IS|IT|JP|KR|KW|LI|LU|NL|NO|PT|SE|SG|TR|US|ZA]	Specifies properties for specific countries. The country codes comply with ISO 3166, however the SCALANCE W744 supports only the codes listed in the left-hand column. AT Austria AU Australia BE Belgium CA Canada CH Switzerland CL Chile CZ Czech Republic DE Germany DK Denmark ES Spain FI Finland FR France GB Great Britain GR Greece HK Hong Kong HU Hungary IE Ireland IS Iceland IT Italy JP Japan KR Korea KW Kuwait LI Lichtenstein LU Luxembourg NL Netherlands NO Norway PT Portugal SE Sweden SG Singapore TR Turkey US United States of America ZA South Africa	This command is not available in the version for USA / Canada.

Command	Description	Comment
name *[device name]*	Assigns a value to the sysName MIB variable.	Maximum of 255 characters. If you want to use the name in WDS or redundancy, the maximum length is 32 characters.
location *[location]*	Assigns a value to the sysLocation MIB variable.	Maximum of 255 characters.
contact *[name]*	Assigns a value to the sysContact MIB variable.	Maximum of 255 characters.
ping [-c N] *<IP Address|name>*	For connection test to partner. -c (counter) for the number of IGMPs	Telnet only
password [admin|user] *[password]*	Specifies a password for access to the SCALANCE W744.	Maximum of 31 characters.

5.2.2 IP Settings Menu Command

Configuration

Here, you decide whether you will use a DHCP server or whether you want to assign a fixed IP address to the SCALANCE W744. You can also set the IP address of a router and the default TTL. The TTL (time to live) parameter specifies the maximum number of routers passed through by a data packet before it is discarded.

Syntax of the Command Line Interface

CLI\SYSTEM\IP>

Command	Description	Comment
dhcp [E|D]	Enable / disable DHCP server.	
ip *[IP address]*	Specifies the IP address for the SCALANCE W744.	When you enter a valid IP address, enabled DHCP is automatically disabled.
subnet *[subnet mask]*	Specifies the subnet mask.	
gateway [*IP address]*	Specifies the IP address of the router.	
ttl *[TTL value]*	Sets the TTL (Time To Live) parameter.	Default value: 64

5.2.3 Services Menu Command

Configuration

Here, you select the services with which access to the SCALANCE W744 will be possible. If, for example, the *SNMP Enabled* check box is not selected, neither write nor read access is possible using the SNMP protocol (v1,v2c,v3). If the SNMP protocol is not permitted, it is not possible to send SNMP traps.

To improve security, you should only enable the services that you actually use.

Notice

Over SNMP, it is possible to disable all services and to allow read access only over SNMP. Following this, no further configuration of the SCALANCE W744 is possible.

Notes on *WEB Enabled in the WEB Interface*

The check box for the *WEB Enabled* entry is selected and inactive because configuration with Web Based Management is no longer possible without the option of access with HTTP.

If you want to deactivate the option of configuration with Web Based Management, you can do this in the Security Wizard over Telnet and SNMP. Settings made using the Security Wizard only take effect after a restart on the SCALANCE W744.

Syntax of the Command Line Interface

CLI\SYSTEM\SERVICES>

Command	Description	Comment
telnet [E|D]	Enable / disable configuration of the SCALANCE W744 over Telnet.	Only WEB and SNMP
ttimeout [E|D]	Enables / disables the time restriction for a Telnet session.	
ttimeout *[time in s]*	Specifies the time after which a Telnet section is closed if there is no further input.	
snmp [E|D]	Enable / disable SNMP.	
mail [E|D]	Enable / disable E-mail.	

Command	Description	Comment
`web [E|D]`	Enable / disable configuration of the SCALANCE W744 over Web Based Management.	
`psu [E|D]`	Enable / disable access to the SCALANCE W744 with the Primary Setup Tool. If this access option is deactivated, configuration data can only be read with the Primary Setup Tool.	

5.2.4 Restart Menu Command

Restart Button

Click this button to restart the SCALANCE W744. During a restart, the SCALANCE W744 is reinitialized, the internal firmware is reloaded, and the SCALANCE W744 runs a self-test. The entries that have been learned in the address table of the SCALANCE W744 are deleted. You can leave the browser window open while the SCALANCE W744 restarts.

Restore Memory Defaults Button

Click this button to reset the configuration. The following parameters (protected defaults) are not restored:

- IP address
- Subnet mask
- Gateway address
- SSID
- IP address of the default router
- DHCP flag
- System name
- System location
- System contact
- Device mode
- Country code

There is no automatic restart. This allows you to enter data using Web Based Management before the restart. The changes take effect only after a restart.

In User mode, this button is not visible.

Restore Factory Defaults and Restart Button

Click on this button to restore the factory configuration settings. The protected defaults (see above) are also reset. The C-PLUG here is also reinitialized and formatted if it exists. An automatic restart is triggered.

Note

By resetting all the defaults, the IP address is also lost. The SCALANCE W744 can then only be accessed using the Primary Setup Tool unless the IP address is obtained over DHCP.

In User mode, this button is not visible.

Syntax of the Command Line Interface

CLI\SYSTEM\RESTARTS>

Command	Description	Comment
restart	Restarts the SCALANCE W744.	The *restart* command can be called from all menus, however not using the shortcut commands.
memreset	Resets the factory settings and triggers a restart (the protected settings are not deleted).	
defaults	Resets the factory settings (the protected settings are also deleted).	

5.2.5 Event Config Menu Command

System Events of the SCALANCE W744

On this page, you specify how the SCALANCE W744 reacts to system events. You can configure the reaction of the SCALANCE W744
-1PRO to the following events:

- Startup of the SCALANCE W744
- Change in the Ethernet status Link up / Link down.
- Error in authentication.
- Changing the power supply of the SCALANCE W744.
  Evaluation of this event is only useful when using a redundant power supply.
- Change in the error status

Reaction to System Events

The following alternatives are possible:

- The SCALANCE W744 sends an E-mail.
- The SCALANCE W744 writes an entry in the log file.
- The SCALANCE W744 indicates an error (the error LED lights up).

By selecting the appropriate check boxes, you specify which events trigger which reactions on the SCALANCE W744. With the check box in the *Functions enabled* row, you enable or disable the sending of E-mails or triggering of SNMP traps.

Syntax of the Command Line Interface

For each of the four possible reactions E-mail, trap, log and fault, either *E* (**E**nabled, setting is enabled) or *D* (**D**isabled, setting is disabled) must be entered as the parameter. If, for example, an E-mail is sent when the SCALANCE W744 restarts (first parameter "*CW*") and an entry is made in the log table but neither a trap nor an error is generated, the following command must be entered:

```
setec CW E D E D
```

CLI\SYSTEM\EVENT>

Command	Description	Comment
`setec CW <E|D> <E|D> <E|D> <E|D>`	Reactions when the SCALANCE W744 restarts.	
`setec LU <E|D> <E|D> <E|D> <E|D>`	Reaction to the *Link Up* event on the Ethernet interface.	If the error status was triggered only due to a link down event, the error states is cleared and the error LED goes off.
`setec LD <E|D> <E|D> <E|D> <E|D>`	Reaction to the *Link Down* event on the Ethernet interface.	
`setec AF <E|D> <E|D> <E|D> <E|D>`	Reaction to a bad authentication over Web Based Management, CLI, or SNMP.	The SNMP trap *AuthFault* is sent only if there is a bad SNMP authentication.
`setec PM <E|D> <E|D> <E|D> <E|D>`	Reaction to a change of power supply over the M12 power connection.	
`setec PE <E|D> <E|D> <E|D> <E|D>`	Reaction to a change of power supply over Ethernet.	
`setec FC <E|D> <E|D> <E|D> <E|D>`	Reaction to a change in the error status.	

5.2.6 E-mail Config Menu Command

Sender and Recipient of an E-mail

Here, you specify who the SCALANCE W744 sends an E-mail to as a reaction to configured events. You can also enter a sender. This allows you to recognize which device is involved and sent the E-mail. If you do not make an entry in the *From* box, the SCALANCE W744 uses the following sender: SCALANCE_W@<*IP address*>

Syntax of the Command Line Interface

CLI\SYSTEM\EMAIL>

Command	Description	Comment
`mail [E|D]`	Enable/disable the E-mail service	
`email` *`[E-mail address]`*	Specifies the address(es) to which the SCALANCE W744 sense E-mails.	Several E-mail addresses can be entered separated by semicolons.
`smtp` *`<IP address> [:port number]`*	Specifies the IP address and the port number of the SMTP server.	
`from` *`[text for sender field]`*	Specifies the sender of E-mails from SCALANCE W744.	

5.2.7 SNMP Config Menu Command

Configuration

Select the check boxes of the entries according to the SNMP functionality you want to use. SNMP version 3 allows permissions to be assigned and protocol level, authentication, and encryption. You specify groups and users in the Groups and Users submenus. You can also make entries there if the *SNMPv3 enabled* check box is not selected, however the entries are not applied.

Notice

When using SNMP version 3, you should disable SNMP V1 and V2 because the security settings of SNMP V3 can be bypassed by access over SNMP V1 or V2.

Trap Submenu

Here, you enter the IP addresses of up to 10 trap receivers. The SCALANCE W744 sends a trap to all the addresses you enter if their Enable trap check boxes are selected.

Groups Submenu

This page displays the SNMPv3 groups. You can create a new group by clicking the *New* button and specifying the group name, the security level, and the write or read permissions.

You can delete a group by selecting the check box in the *Del* column and clicking the *Set Values* button. If members are already entered in the group, you cannot delete the group nor is it possible to change the security level of the group.

There are three SNMPv3 security levels:

Security Level	Special Features	Comment
None	No authentication, no encryption.	
Auth/No Priv	Authentication with the MD5 or SHA algorithm, no encryption.	To display the members of the group, you must enter the authentication password (maximum of 63 characters).
Auth/Priv	Authentication with the MD5 or SHA algorithm, encryption with the DES3 algorithm.	To display the members of the group, you must enter the authentication password (maximum of 63 characters).

Users Submenu

This page displays the SNMPv3 users. You can create a new user by clicking the *New* button and specifying the user name and the group to which the user will belong. If necessary, you must also enter the passwords for the authentication and for the encryption.

You can delete a user by selecting the check box in the *Del* column and clicking the *Set Values* button.

Syntax of the Command Line Interface

`CLI\SYSTEM\SNMP>`

Command	Description	Comment
`snmp [E|D]`	Enables / disables SNMP.	Enables / disables SNMPv1, v2c, v3 and Traps.
`snmpv1 [E|D]`	Enables / disables SNMPv1/v2c.	Enables / disables SNMPv1, v2 and Traps.
`snmpv3 [E|D]`	Enables / disables SNMPv3.	The special features of SNMPv3 undertake effect after you disable SNMPv1. Enabling SNMPv3 does not automatically disable SNMPv1.
`snmpro [E|D]`	Enables / disables SNMPv1/v2c read only.	
`getcomm` *`[Read community string]`*	Specifies the Read community string, maximum length 63 characters.	The default is *public*.

Command	Description	Comment
`setcomm [Write community string]`	Specifies the Write community string, maximum length 63 characters.	The default is *private*.
`traps [E|D]`	Enables / disables SNMPv1 traps.	Traps are then enabled, if SNMP v1, v2c is also enabled.

`CLI\SYSTEM\SNMP\GROUP>`

Command	Description	Comment
`add <Name> [NOAUTH|AUTH|PRIV] [R|W]`	Adds an SNMPv3 group. NOAUTH – No authentication, no encryption; AUTH - Authentication with MD5 or SHA algorithm, no encryption. PRIV - Authentication with MD5 or SHA algorithm and encryption with the DES3 algorithm. R – Read access; W - Write access	Write access without read access is not possible.
`edit <Index> [NOAUTH|AUTH|PRIV] [RE|RD|WE|WD]`	Changes the security level of the group and sets the access rights. You can view of the index of the group with the "info“ command. RE – allows read access; RD – denies read access; WE – allows write access; WD – denies write access;	You cannot edit the authentication and encryption settings unless the group is empty. Preventing read access also prevents write access. Permitting write access also permits read access.
`delete <Index>`	Deletes the SNMPv3 group from the group list at the index position.	Is only possible to delete a group if it is empty.
`clearall`	Clears all SNMP groups that are empty.	

CLI\SYSTEM\SNMP\USER>

Command	Description	Comment
add *<user name>* *<group name>* [NONE|MD5|SHA] [*authentication ID*] [*Encryption ID*]	Assigns an SNMPv3 user to a group. If authentication is necessary for the group, the algorithm must be specified as a parameter (MD5 or SHA). If authentication is necessary for the group, the authentication password must be specified If encryption is necessary for the group, the encryption password must be specified as a parameter.	The authentication password and the encryption password can be a maximum of 63 characters long.
edit *<Index>* *<group name>* [NONE|MD5|SHA] [*authentication ID*] [*Encryption ID*]	Changes the group assignment, the authentication algorithm, and the encryption password of the SNMPv3 user.	
delete *<Index>*	Deletes an SNMPv3 user from the list at the point identified by the index.	
clearall	Deletes all SNMPv3 users.	

CLI\SYSTEM\SNMP\TRAP>

Command	Description	Comment
traps [E|D]	Enables / disables SNMP traps.	Traps are then enabled, if SNMP v1, v2c is also enabled.
settrap *<entry>* *<IP address>* <E|D>	Specifies the IP address of the trap recipient *entry* (*entry* between 1 and 10) and enables / disables the sending of traps to this recipient.	

5.2.8 SNTP Config Menu Command

Time-of-Day for Synchronization in the Network

SNTP is the acronym for **S**imple **N**etwork **T**ime **P**rotocol. An SNTP server uses this protocol to provide a uniform time throughout the entire network. Clients can synchronize themselves with this time.

If you enter the IP address of an SNTP server here and select the time zone of the SCALANCE W744, the SCALANCE W744 uses the time information from the server. The SCALANCE W744 adopts this time information without any further conversion regarding daylight-saving or standard time.

Syntax of the Command Line Interface

CLI\SYSTEM\SNTP>

Command	Description	Comment
`server [IP address]`	Specifies the IP address of the SNTP server.	
`tzone [hours]`	Specifies the deviation of the time zone of the SCALANCE W744 according to UTC (Universal Time Conversion) in hours.	

5.2.9 Fault State Menu Command

This page displays information on faults/errors that have occurred. You can delete this information if you click on the *Remove Fault State* button.

If you operate the SCALANCE W744 as an access point, texts (for example *Link with some safe-ip client(s) is/was broken*) are also displayed here for the IP Alive and Link Check functions. After clicking on the text, the SCALANCE W744 displays a list with the individual error messages. You acknowledge each error message by clicking on it. Acknowledged messages are cleared from the list. You can acknowledge all messages at once by clicking on the text *Acknowledge all errors*.

CLI\SYSTEM\FAULT>

Command	Description	Comment
`fault [OFF]`	Display the fault status and cause of the fault.	You can reset the LED and the fault status with the command: "fault OFF“. Ideally, however, the cause of the problem should be eliminated.

5.2.10 Load & Save Menu Command

Saving and Loading Device Data

Clicking the Load & Save menu command first opens a page with the current firmware version. The *HTTP* and *TFTP* submenus allow you to save device data in external files or to transfer data from external files to the SCALANCE W744.

You can save the following device data in external files:

- the configuration data of the SCALANCE W744
- the content of the log table
- the firmware of the SCALANCE W744

You can transfer the following data from external files to the SCALANCE W744:

- the configuration data of the SCALANCE W744
- the firmware of the SCALANCE W744

For a SCALANCE W744 certificates for the client and for the server can also be downloaded and stored. For further information on certificates, please refer to the *System Manual Basics of Industrial Wireless LAN*.

Note

When you download the configuration data to a SCALANCE W744, a restart is performed automatically so that the new data is adopted correctly. The device can no longer be reached using the old IP address if the downloaded configuration data contains a new IP address.

Reusing Configuration Data

Saving and reading in configuration data reduces the effort if several SCALANCE W744 devices have the same configuration and when IP addresses are obtained over DHCP. Save the configuration data on a PC after you have configured a SCALANCE W744. Download this file to all other SCALANCE W744 devices you want to configure. If necessary, you may need to assign an IP address to this SCALANCE W744 first using the Primary Setup Tool.

How to Load or Save Data over HTTP

1. Specify the name of the file from which the data will be taken or where the data will be saved in the relevant text box for the configuration data or firmware. As an alternative, you can also use a file selection dialog that opens after you click the *Browse...* button.

2. Start the save function by clicking the *Save* button. Start the load from file function by clicking the *Load* button.

How to Load or Save Data over TFTP

1. Enter the IP address of the FTP server in the *TFTP Server IP* text box.
2. Enter the port of the FTP server in the *Port* text box in the default value does not meet your requirements.
3. Click on the Set Values button before you enter any further information for saving the data.
4. Specify the name of the file (maximum 32 characters) from which the data will be taken or where the data will be saved in the relevant text box for the configuration data or firmware.
5. Start the save function by clicking the *Save* button. Start the load from file function by clicking the *Load* button.

Syntax of the Command Line Interface

CLI\SYSTEM\LOADSAVE>

Command	Description	Comment
fwname *[file name]*	Specifies the name of a file from which the firmware will be loaded or in which the firmware will be saved. This name can be a maximum of 32 characters long.	
fwload	Loads the firmware from a file.	
fwsave	Saves the firmware in a file.	
cfgname *[file name]*	Specifies the name of a file from which the configuration data will be loaded or in which the configuration data will be saved.	
cfgload	Loads the configuration data from the file	
cfgsave	Saves the configuration data in a file.	
logname *[file name]*	Specifies the name of a file in which the log table will be saved.	
logsave	Saves the log table in a file.	
server *[IP address]* :*[port number]*	Specifies the IP address and the port of the TFTP server.	
cltcert *<certificate>*	Specifies the name of the certificate for the client.	In client mode only.
cltpass *<password>*	Authorizes use of the certificate,	In client mode only.
cltload	Downloads the client certificate from a file.	In client mode only.
cltsave	Saves the client certificate in a file.	In client mode only.
srvcert *<certificate>*	Specifies the name of the certificate for the server.	In client mode only.

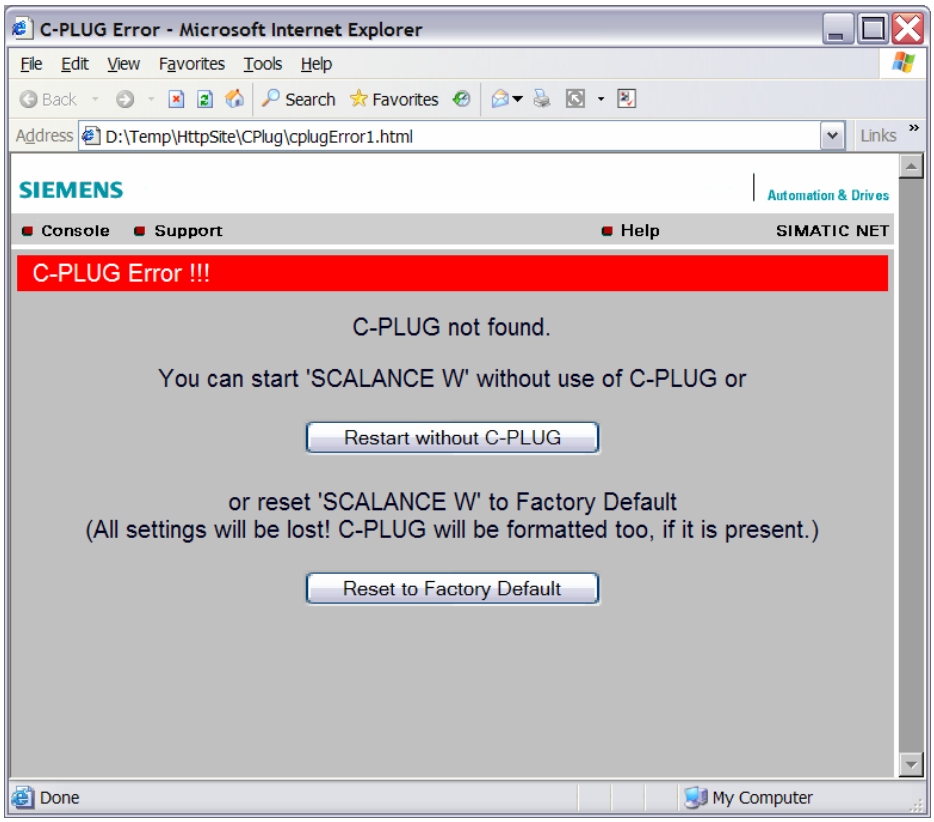
Command	Description	Comment
srvload	Downloads a server certificate from a file.	In client mode only.
srvsave	Saves the server certificate in a file.	In client mode only.

5.2.11 C-PLUG Menu Command

C-PLUG Error Message

If the SCALANCE W744 detects a C-PLUG error during startup, a message is displayed by Web Based Management. C-PLUG errors can have two causes:

- The C-PLUG contains bad data or data for a different device type.
- There is no C-PLUG in the SCALANCE W744 although a C-PLUG was present prior to the last shutdown of the device.


C-PLUG Error - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites
Address D:\Temp\HttpSite\CPlug\cplugError1.html
Links
SIEMENS
Automation & Drives
Console Support Help SIMATIC NET
C-PLUG Error !!!
C-PLUG not found.
You can start 'SCALANCE W' without use of C-PLUG or
Restart without C-PLUG
or reset 'SCALANCE W' to Factory Default
(All settings will be lost! C-PLUG will be formatted too, if it is present.)
Reset to Factory Default
Done
My Computer

Syntax of the Command Line Interface

CLI\SYSTEM\CPLUG>

Command	Description	Comment
initdef	Reinitializes the C-PLUG and copies the default configuration to it.	All information is deleted.
initmem	Reinitializes the C-PLUG and copies the configuration currently stored internally to it.	All information is deleted.
bootfrom [MEMORY]	Displays the source medium from which the configuration is currently being read: C-PLUG or MEMORY. The restart is performed automatically.	If the C-PLUG was removed, you must specify that the configuration must be read from internal memory. If a C-PLUG is inserted, the system or as attempts to read the configuration from it. The *bootfrom [MEMORY]* command then has no effect.

5.3 The Interfaces Menu

Introduction

The SCALANCE W744 has one Ethernet interface and up to two WLAN interfaces that can be configured separately. In the pages of this menu, you can configure both the wired Ethernet interface and the WLAN interface.

5.3.1 Ethernet Menu Command

Transmission Speed and Mode

For a wired Ethernet interface, you only to specify the transmission speed / mode parameters and the crossing over of the Ethernet connection. When you select the entry *Auto* in the *Speed / Mode* list box, the SCALANCE W744 sets a suitable speed and mode depending on the other network nodes and crosses over the Ethernet connection.

If you select an entry other than *Auto* in the *Speed / Mode* list box, you must specify the crossing over of the Ethernet connection manually with *Ethernet crossing*.

Note

If you specify the mode, you must make the same settings on the partner device.

Syntax of the Command Line Interface

`CLI\INTERFACES\ETHERNET>`

Command	Description	Comment
`ethspeed [A|100F|100H| 10F|10H]`	Specifies the transmission speed and mode of the Ethernet interface: A automatic selection by the SCALANCE W 788 100F 100 Mbps full duplex 100H 100 Mbps half duplex 10F 10 Mbps full duplex 10H 10 Mbps half duplex	
`ethcross [E|D]`	Manual selection of Ethernet interface crossover. Possible only when ethspeed is not set to auto.	

5.3.2 WLAN Menu Command

Enabling the Interface

Enabling interface by selecting *Enable Interface*.

Infrastructure / Ad Hoc

Select Infrastructure to connect to an access point. Ad hoc is used to connect clients with each other without an access point. This is only possible when ad hoc is set on all clients.

Transmission Mode

Specify the transmission mode in the *Wireless Mode* list box.

Channel Selection

You can only set a channel in the ad hoc mode.

MAC Address of the Client

To allow the device connected to the client to be available over the wireless network, the client must adopt the MAC address of this device. This can be done automatically by the client adopting the MAC address of the first frame that it receives over the Ethernet interface. If this is required, *Auto find Adopt MAC* must be selected. If this is not selected or no selection is possible, Lee MAC address of the device connected to the client over Ethernet must be entered in the *Adopt MAC* text box.

Shortened Preamble with 802.11b

The 802.11b standard allows the use of shortened preambles in the wireless transmission of data packets. This increases the amount of user data.

Note

If you are using the CP 1515 and CP 7515 communications processors in one wireless cell at the same time, the shortened preamble should not be used otherwise the CP 1515 can only handle a significantly reduced amount of data traffic when there is heavy load on the network.

Syntax of the Command Line Interface

CLI\INTERFACES\WLAN1>

Command	Description	Comment
`port [E|D]`	Enable / disable wireless port.	
`ssid [`*`network name`*`]`	Assigns a network name (SSID).	Available only in the access point mode.
`mode [A|B|G|T|X]`	Selects the transmission standard: A 802.11a B 802.11b G 802.11g T 802.11a Turbo X 802.11g Turbo	Depending on the country code, some settings are not possible and will then be rejected. 802.11a Turbo cannot be set in all countries.
`autoch [E|D]`	Enable / disable the channel selection by the SCALANCE W744.	Available only in the access point mode.
`channel [1...13]`	Specifies the wireless channel.	
`adopt [`*`MAC address`*`]`	MAC address of the device connected to the client over Ethernet.	Available only in the client mode.
`autoadopt [E|D]`	Automatic adoption of the MAC address of the device connected to the client over Ethernet. **Note: This function is available only in conjunction with S7 devices.**	Available only in the client mode.
`adhoc [E|D]`	Select ad hoc or infrastructure mode.	Available only in the client mode.

Command	Description	Comment
`anyssid <E|D>`	With ANY SSID, the client connects to the best access point in the environment in which it is permitted to connect.	Available only in the client mode.

5.3.3 Advanced Submenu

Configuring Transmission Characteristics

On this page, you can specify details of the transmission characteristics. You only need to adapt the parameters on this page if the SCALANCE W744 cannot be used as it is intended with the default settings.

Transmit Power

In the *Transmit Power* list box, you can specify the output power of the SCALANCE W744. It may be necessary to reduce the transmit power when using antennas to avoid exceeding the maximum legal transmit power. Reducing the transmit power effectively reduces cell size.

Beacons

Beacons are packets that are sent cyclically by a SCALANCE W744 to inform clients of its existence. In the *Beacon Interval* text box, you specify the interval at which the SCALANCE W744 sends beacons.

RTS/CTS

RTS/CTS (**R**eady **T**o **S**end/**C**lear **T**o **S**end) is a method of avoiding collisions based on an exchange of status information prior to sending the actual data. To minimize network load resulting from the additional protocol exchange, this method is used only when a packet size that you select with the *RTS/CTS Threshold* is exceeded.

Fragmentation

The *Fragmentation Length Threshold* parameter specifies the maximum package size transferred on the radio link. Large packets are divided up into small packets prior to transmission and then reassembled into the original size after they have been received. This can be beneficial if the transmission quality is poor because larger packets are more difficult to transmit. This does, however, result in a poorer data throughput.

Repetitions

There are two situations in which packets are repeated. The hardware repetition is performed by the WLAN chip itself when it tries to repeat an unacknowledged packet immediately. The number of attempted repetitions is specified with the *HW Retry number* parameter.
If the number of retries is reached without success, the packet is temporarily withdrawn and all other packets in the buffer are sent first. Following this, transmission of the packet is attempted again. The number of such repetitions is specified with the *SW Retry number* parameter.
Using *Use SW Retry*, the software repetition mechanism can be disabled.

Antennas

The *Antenna Mode* list box specifies the use of antennas. The *Diversity* setting takes the best of the two antennas for the data transmission. For each WLAN interface, both antennas must be connected. If only one antenna is connected, this must be selected here. The second antenna socket must also have a 50 Ω terminator fitted.

Scanning for Access Points

While the client is connected to an access point, it scans for other access points in the background with which it connects when necessary. There are three modes for scanning access points that can be selected in the *Background scan mode* list box.
If you set *Disable*, there is no scan for access points while the client is connected.
If you set *Scan if Idle*, there is a scan for access points when no data transfer takes place for a certain time.
If you set *Scan Always*, access points are scanned continuously.
The *Background scan interval* parameter specifies the interval at which further access points are scanned.

To optimize the scanning for further access points, you can specify channels for the client on which other access points can be found. To allow this, the *Background Scan Ch.Select* check box must be set and the channels of the other access point is entered in the *Background Scan Channels* text box. Enter the channels separated by blanks.

If the client finds a better access point, it attempts to connect to it. Before it changes, the new access point must be better than the current access point by a certain value. The threshold at which the client changes to the new access point can be specified with the *Roaming threshold* parameter.

Syntax of the Command Line Interface

CLI\INTERFACES\WLAN1\ADVANCED>

Command	Description	Comment
power [0...4]	Specifies by how many dB the transmit power will be reduced compared with full power: 0 Full power 1 -3 dB 2 -6 dB 3 -9 dB 4 Minimum power	
beacon [20 ... 1000]	Specifies the beacon interval in milliseconds.	
rtsthr [1 ... 2346]	Specifies the packet size as of which RTS/CTS is used.	
fragthr [256 ... 2346]	Specifies the size as of which packets are fragmented.	
bkscan [D|I|A]	Specifies the mode in which the client stands for further access points.	
bkscanint [200...60000]	Interval at which the client scans for further access points.	
bkchannel [channels]	Selection of channels on which the client scans for further access points. The channels are entered separated by blanks.	
bkchsel [E|D]	Enables / disables scanning for further access points to specific channels.	
swretry [E|D]	Enables / disables the software retry functionality.	
swretno [0 ... 15]	Specifies the number of software retries.	
hwretno [0 ... 15]	Specifies the number of hardware retries.	
caltime <0 ... 65535>	Specifies the time in seconds after which the chipset is calibrated.	
preamb <E|D>	Enables / disables the short preamble.	
antenna <A|B|D>	Specifies which antennas are used: A only antenna A B only antenna B D both antennas (diversity)	

5.3.4 SSID List Submenu Command

Network Attachment of the Client

With this men command, you can specify how the SCALANCE W744 connects to a network as client:

- If the *Connect to ANY SSID* check box is selected, the SCALANCE W744 attempts to connect to the network with the best transmission quality and with suitable security settings. If the *Closed Wireless System* setting is made for an access point, the SCALANCE W744 cannot log on there with the *ANY* SSID.
- If this check box is not selected, the SCALANCE W744 attempts to connect to the network from the SSID list that has the best transmission quality.

An SSID is absolutely necessary in ad hoc networks.

Syntax of the Command Line Interface

CLI\INTERFACES\WLAN1\SSID>

Command	Description	Comment
add *<network name>*	Adds a network name (SSID) to the SSID list.	Available only in the client mode.
edit *<Index>* *<network name>*	Changes the network name (SSID) at the index location in the SSID list.	Available only in the client mode.
delete *<Index>*	Deletes the network name (SSID) from the SSID list at the index location.	Available only in the client mode.

5.3.5 Advanced G Submenu

Properties of the 802.11g Standard

The IEEE 802.11g is upwards compatible with IEEE 802.11b, both use the 2.4 GHz band. In contrast to 802.11b that specifies data rates up to 11 Mbps, 802.11g provides for data rates up to 54 Mbps. The 802.11g standard also uses the OFDM modulation scheme.

Special Options for 802.11g Settings

The options you can set in the *Advanced G* submenu relate to the way in which management and control data (RTS/CTS frames, beacons) are sent in the 802.11g mode. You can also specify that the SCALANCE W744 only supports 802.11g-compatible devices.

Handling 802.11b Clients

The access point automatically detects whether 802.11b clients exist in the environment. To avoid 802.11g packets colliding with 802.11b packets, the access point can use the RTS/CTS method.
With the *802.11g CTS Mode* list box, you specify the use of RTS/CTS (only in the access point mode).
0 do not use RTS/CTS.
1 always use RTS/CTS with 802.11g packets.
2 only use RTS/CTS when there are 802.11b clients in environment.

You can set the data rate for RTS/CTS frames in the *802.11g CTS Rate* list box.

With the *802.11g CTS Type* list box, you specify whether a CTS or RTS/CTS is sent.

802.11g Expansions

With the *802.11g Short Slot Time* parameter, you specify whether or not the short slot time is used. This short slot time should be supported by all newer clients.

The *802.11g Basic Rate* list box specifies the minimum data rate that must be supported by clients before they can connect to the access point (only in the access point mode).

With the *802.11g Only Mode* parameter, you can specify that only 802.11g clients can log on at the access point and also that only 802.11g rates are permitted (only in the access point mode).

Syntax of the Command Line Interface

CLI\INTERFACES\WLAN1\802.11G>

Command	Description	Comment
`ctsrate [0|1|2|3]`	Specifies the data rate for 802.11g CTS frames: 0 1 Mbps 1 2 Mbps 2 5.5 Mbps 3 11 Mbps	
`ctstype [0|1]`	Specifies the method for avoiding 802.11g packet collisions: 0 CTS only 1 RTS/CTS	
`sslot [E|D]`	Enables / disables short slot times between data packets.	

5.4 The Security Menu

Introduction

In this menu, you configure the security settings with which you want to operate your SCALANCE W744. Apart from selecting the authentication and encryption scheme, this also includes the decision as to whether or not an external Radius server is used and whether access is restricted based on MAC addresses (ACL).

Syntax of the Command Line Interface

```
CLI\SECURITY>
```

Command	Description	Comment
`mgmteth [E|D]`	It is only possible to configure the SCALANCE W744 over the wired Ethernet interface (*E*) or over all interfaces (*D*).	

5.4.1 Basic Wireless Menu Command

Authentication

You can set the following options in the *Authentication Type* box:

- Open System
  There is no authentication.
- Shared Key
  WEP authentication with keys stored on the device. In this case, you must specify a key in the *Keys* menu.
- WPA (Radius)
  WPA authentication over an external RADIUS server (802.1x).
- WPA-PSK
  WPA authentication without Radius server.
- 802.1x
  Port-related access control with a Radius server. With this method, the client must authenticate itself with a RADIUS server based on certificates. If the authentication is successful, the ES server generates a pair of keys that is used for encryption of communication.

Encryption

You can only disable encryption (deselect the *Encryption* check box) if you have selected *Open System* or *802.1 with Mixed Mode* for the authentication. All other security methods include both authentication and encryption.

Encryption Methods for WPA

If you have selected *WPA* authentication (both PSK and Radius), you have the following alternatives in the *Cipher* box:

- AES (**A**dvanced **E**ncryption **S**tandard)
  Encryption according to the Rijndael algorithm.
- TKIP
  Use of dynamic keys. Starting from an initialization key, a new key is generated for each data packet.

Additional Entries for WPA-PSK

To use the WPA-PSK scheme, you must enter a string in the *Pass Phrase* box that is used by the SCALANCE W744 to initialize dynamic key generation.

Syntax of the Command Line Interface

CLI\SECURITY\BASIC\WLAN1>

Command	Description	Comment
`authent [0|1|2|3|4]`	Specifies the authentication type. For the parameter *n*, enter a number between 0 and 4 for the type authentication: 0 Open System 1 Shared Key 2 WPA (RADIUS) 3 WPA-PSK 4 802.1x (RADUIS)	
`encrypt [E|D]`	Encryption enabled / disabled.	
`cipher [AUTO|WEP|AES|TKIP]`	Specifies the encryption scheme.	
`defkey [0|1|2|3]`	Selects the default WEP key.	
`wpaphrase` *`[WPA password]`*	Enter the WPA-PSK password.	The password must be at least 8 characters long, the maximum length is 63 ASCII characters or 64 hexadecimal characters.
`username` *`[name]`*	Specifies the user name for the RADIUS server.	

Command	Description	Comment
`password [password]`	Specifies the password for the RADIUS server.	
`chkserver [E|D]`	Enables / disables authentication of the server.	

5.4.2 Keys Menu Command

Specifying the WEP/AES Key

To allow you to enable the encryption for the Open System and Shared Key authentication methods, you must first enter at least one key in the key table.

You can also create keys for WDS Redundancy and ACL Private (these are not supported by all clients for ACL).

Note

When operating the CP 7515, note the following when configuring the keys on the SCALANCE W744:

The ACL key and the WEP key must be of the same length since the CP 7515 only allows a uniform key length. If the Windows-specific program Zero-Config is used even the keys must be the same.

Syntax of the Command Line Interface

`CLI\SECURITY\KEYS\WLAN1>`

Command	Description	Comment
`add <Len> <Key> [Index]`	Adds at a key at the end or at the specified *Index* of the table.	Indexes from 5 onwards are private keys
`edit <Index> <Len> <Key>`	Changes the key at the *Index* location.	
`delete <Index>`	Deletes the key at the *Index* location.	
`clearall`	Deletes all keys.	

5.4.3 Access Menu Command

Access Permissions for IP Addresses

In this menu, you specify the access permissions for IP addresses. You can specify whether management access (SNMP, Telnet, WBM) is possible with the defined addresses:

- Management access is possible only with the defined addresses.
- Management access is possible with all IP addresses not included in the list.

Note

The defined access rights also apply to the PC used for configuration. If you have not entered the local IP address and have set the ACL mode to *Accessed*, no further access to the SCALANCE W744 is possible

You should also note that the IP address of the client can change if you use DHCP without reservation.

Syntax of the Command Line Interface

CLI\SECURITY\ACCESS>

Command	Description	Comment
access [E|D]	Enable / disable access control list.	
statmgmt [A|D]	It is possible to access or not possible to access the IP addresses of the access control list (**A**ccessed / **D**enied).	
add <IP>	Adds a new IP address	
edit *<Index|IP addrss>* [E|D]	Enables / disables the entry in the table specified by the index or IP address.	
delete *<Index|IP address>*	Deletes the entry.	
clearall	Clears the access control list.	

5.5 The Bridge Menu

Introduction

A bridge is a network component that connects two networks. A bridge is not dependent on the protocol; management of the data packages is based on the physical address of the network nodes (MAC address).

The SCALANCE W744 provides bridge functionality because it handles data exchange between wired and wireless Ethernet. The following sections describe the functions that are available and how you configure and use them.

Deleting Aged Bridge Information

The SCALANCE W744 saves the information about which MAC address can be reached over which port in a learning table. Entries in this list are deleted automatically when there is no further data transfer for the corresponding MAC addresses. You can decide the length of time after which addresses are deleted if no data is sent using the *Aging Time* parameter on the start page of the *Bridge* menu.

Syntax of the Command Line Interface

`CLI\BRIDGE\>`

Command	Description	Comment
`aging [E|D|`*`aging time`*`]`	Enables / disables automatic deletion of information on the assignment of MAC addresses and ports. With the Aging time parameter, you can change the time.	Aging time can be from 10 sec through 1.000.000 sec. The default is 300 sec (5 min)

5.5.1 Learning Table Menu Command

Assignment of MAC Address and Port

The learning table contains the information about whether a MAC address can be reached over the wired Ethernet interface or over the wireless interfaces. The SCALANCE W744 obtains this information from the active data exchange.

5.5.2 ARP Table Menu Command

Assignment of MAC Address and IP Address

The ARP protocol (**A**ddress **R**esolution **P**rotocol) obtains the corresponding MAC address of a known IP address. The page of this menu command also indicates the interface over which an address can be reached. The last column indicates how the information was obtained (for example *dynamic* if it was obtained during operation or *static* if it was configured).

5.6 The Information Menu

System Events and Information on the Protocols

The pages of this menu display tables contain information on system events and on the behavior of the protocols (IP, TCP, UDP, and ICMP, SNMP).

Updating the Display

Most pages have the *Refresh* button at the bottom edge with which you can update the display. The *Client List* menu command also allows you to update automatically. To activate this, select the *Update* check box.

Syntax of the Command Line Interface

`CLI\ ... >`

Command	Description	Comment
`info`	Displays information on the current menu item.	This can be called in every submenu.

5.6.1 Log Table Menu Command

Logging System Events

This page lists system events and the time at which they occurred. You can specify which events are included here in the *System* > *Events* menu.

Syntax of the Command Line Interface

`CLI\INFORM\LOG>`

Command	Description	Comment
`events <show|clear>`	Displays or deletes the log table.	
`addevent <Text>`	Adds an event to the log table.	
`eventmax [Max. count]`	Sets the maximum number of log entries.	The default is 400.

5.6.2 Auth Log Menu Command

Logging Authentication

The pages of this menu contain a table with information on successful or failed authentication attempts.

Syntax of the Command Line Interface

CLI\INFORM\LOG>

Command	Description	Comment
`show [0...8]`	Displays the authentication entries. By specifying a parameter, the display can be limited to specific information: 0 All 1 Good 2 All errors 3 802.11 errors 4 ACL errors 5 RADIUS errors (request denied, password denied etc.) 6 802.1x errors (timeout, no response from RADIUS or WPA server) 7 Deauthenticated errors 8 Deassociated errors	
`clear`	Deletes all entries.	

5.6.3 Versions Menu Command

Version Information

This page displays the version numbers of hardware and software.

Syntax of the Command Line Interface

CLI>

Command	Description	Comment
`info`	Displays the version information.	

5.6.4 Available WLAN Menu Command

Available Access Points

Here, all the access points visible to the SCALANCE W744 are displayed.

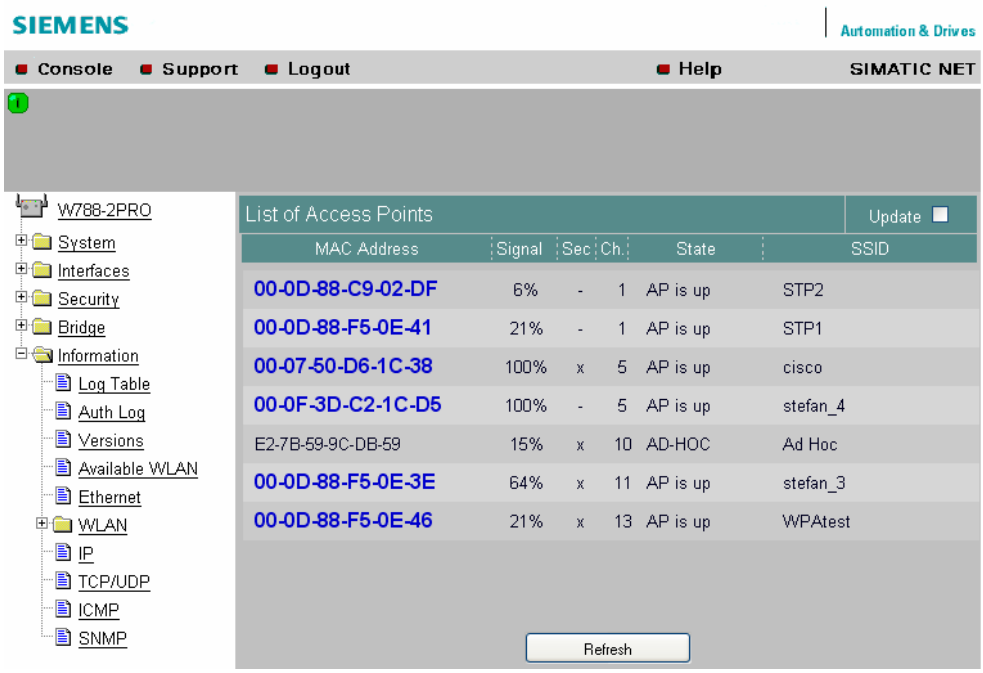
MAC address
The MAC address of the Access Point.

Signal
The signal strength of the Access Point. The higher the value, the better the signal.

Sec
Here, you can see whether encryption is activated.

Channel.
The current channel on which this access point is transmitting.

State
The current state of the Access Point.



By selecting the *Update* check box, the list is updated automatically every 2 seconds. If you click on the MAC address of an Access Point, you will receive additional information on this Access Point.

Syntax of the Command Line Interface

`CLI\INFORM\WLAN1>`

Command	Description	Comment
`station`	Displays information on the available Access Points.	
`resetStats`	Resets the statistics that are displayed with the *Station* command.	
`scan`	Displays all the access points in the area.	
`noise`	Shows disturbances on the individual channels.	

5.6.5 Ethernet Menu Command

Information on the Ethernet Interfaces

This menu command provides information on the current settings of the Ethernet interface. The current operating data is also displayed here.

Syntax of the Command Line Interface

There are no CLI commands for this menu command.

5.6.6 WLAN Menu Command

Information on the WLAN Interface

This menu command provides information on the current settings of the WLAN interface. The current operating data is also displayed here.

5.6.7 IP, TCP/IP, ICMP, SNMP Menu Command

Information on Protocols

The pages of this menu show information on the IP, TCP, UDP, ICMP, and SNMP protocols in the form of tables.

There are no CLI commands for this menu command.

Technical Specifications

6

Data Transmission	
Transmission rate for Ethernet	10/100 Mbps
Transmission rate for wireless	1 ... 54 Mbps (108 Mbps)
Supported standards for wireless	802.11a, 802.11b, 802.11g
Supported standards for energy supply	802.3 af (Power over Ethernet)
Interfaces	
Energy	• M12 connector (24...48 V DC) • Power contacts in the hybrid connector (24...48 V DC) • RJ-45 jack power-over-Ethernet (48 V DC) 2 DC 24V power supplies (18 through 32 V DC) safety extra-low voltage (SELV). Power supply voltage connected over high resistance with housing (not electrically isolated).
Data	IE IP67 hybrid connector 2 R-SMA antenna sockets
Electrical Data	
Power supply	20 ... 57 V DC voltage 90 ... 265 V AC (only when using PS 791-1PRO)
Power consumption	< 10 W
Construction	
Dimensions without antennas (W x H x L)	125 mm x 88 mm x 108 mm
Weight	approx. 1050 g
Permitted ambient conditions	
Operating temperature	-20° ... 60° C
Transport and storage temperature	-40° ... 70° C
Humidity no condensation	95%

Technical Specifications ANT795-4MR

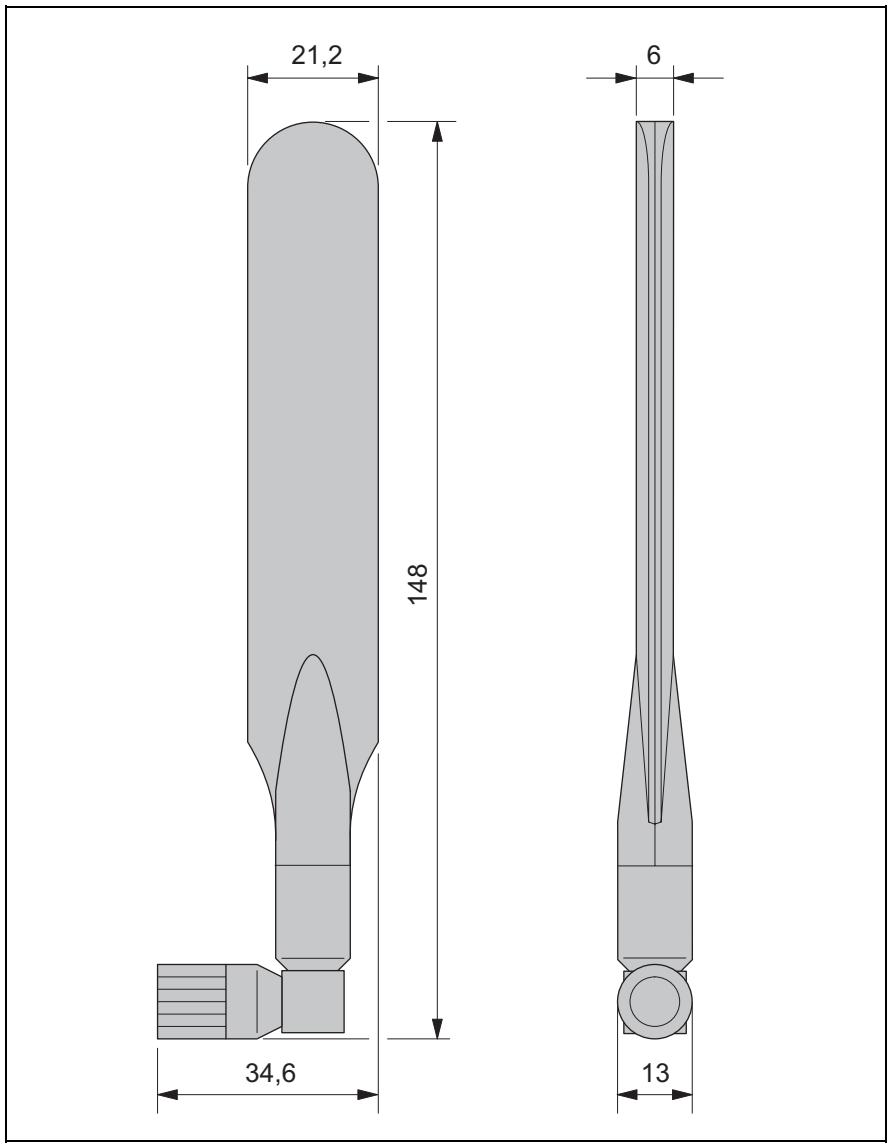
Mechanical Properties

Connector	R-SMA male for connection to SCALANCE W744
Cover material	Polycarbonate
Silicone-free	

Electrical Properties

Frequency range	2.4 ~ 2.4835 GHz 5.15 ~ 5.35 GHz 5.725 ~ 5.85 GHz
Impedance	50 Ohms
Voltage standing wave ratio	≤ 2,0
Return loss	≤ -10 dB
Gain at 2.45 GHz	*3* dBi
Gain at 5.25 GHz	5 dBi
Polarization	Vertical
Operating temperature	- 20 °C.... + 60 °C

Dimension Drawing



Approvals

CE Conformity

The products

SIMATIC NET SCALANCE W788-1PRO
SIMATIC NET SCALANCE W788-2PRO
SIMATIC NET SCALANCE W744-1PRO

in the version put into circulation by Siemens A&D conform to the regulations of the following European directive:

99/5/EC
Directive of the European Parliament and of the Council relating to Radio Equipment and Telecommunications Terminal Equipment and the Mutual Recognition of their Conformity.

Conformity with the essential requirements of the directive is attested by adherence to the following standards:

EN 60950
Safety of Information Technology Equipment

EN 301 489-1
Electromagnetic Compatibility for Radio Equipment and Services

EN 301 489-17
Specific Conditions for Wideband Transmission Systems and High-Performance Radio Local Area Network (HIPERLAN) Equipment

EN 300 328
Electromagnetic Compatibility and Radio Spectrum Matters

EN 301 893
Broadband Radio Access Networks (BRAN) - 5-GHz high-performance RLAN

EN 50371
Generic standard to demonstrate the compliance of low power electronic and electrical apparatus with the basic restrictions related to human exposure to electromagnetic fields (10 MHz to 300 GHz)

1999/519/EC
Council recommendation on the limitation of exposure of the general public to electromagnetic fields (0 Hz to 300 GHz)

Devices connected to the system must meet the relevant safety regulations.

The EU declaration of conformity is available for the responsible authorities according to the above-mentioned EU directive at the following address:

Siemens Aktiengesellschaft
Bereich Automatisierungs- und Antriebstechnik
Industrielle Kommunikation (A&D PT2)
Postfach 4848
D-90327 Nuernberg

This declaration certifies compliance with the directives named above, but does not guarantee any specific properties.

Konformitätserklärung / Declaration of Conformity

Manufacturer / responsible person	Dietmar Herian
Address:	Siemens AG A&D PT 2 Östliche Rheinbrückenstr. 50 76187 Karlsruhe
Declares that the product:	
type:	Scalance W 700-V1
model:	Scalance W744-1PRO Scalance W788-1PRO Scalance W788-2PRO
Intended use	Wireless Communication

Complies with the essential requirements of Article 3 of the R&TTE 1999/5/EC Directive, if used for ist intended use and that the following standards has been applied:

1. Safety (Article 3.1.a of the R&TTE Directive)

Applied standard(s)	issue
EN 60950	2000

2. Electromagnetic compatibility (Article 3.1.b of the R&TTE Directive)

Applied standard(s)	issue
EN 301489-1 V1.4.1	2002-08
EN 301489-17 V1.2.1	2002-08

3. efficient use of the radio frequency spectrum (Article 3.2 of the R&TTE Directive)

Applied standard(s)	issue
EN 300 328-2 V1.2.1	2001-12
EN 301 893 V1.2.3	2003-08

4. Health (Article 3.1a of the R&TTE Directive)

Applied standard(s)	issue
EN 50371	2002
1999/519/EC	

Nuremberg,
May 14th, 2004
(Place and Date)

Dietmar Herian,
General Mananger
(Name and Signature)

Siemens AG
A&D PT 2
Gleiwitzer Str. [illegible]
90475 Nürnberg

ATEX, cULus and FM Approvals

The product

SIMATIC NET SCALANCE W744-1PRO

has the following approvals

EN50021

UL 60950-1

FM Hazardous (Classified) Location Electrical Equipment:

Non Incendive / Class I / Division 2 / Groups A,B,C,D / T* and
Non Incendive / Class I / Zone 2 / Group IIC / T*

(T* = You can find precise statements for this temperature class on the name-plate)

Warning

When operated in explosive environment (Zone 2) too, the product SCALANCE W788 must be installed in an enclosure, which fulfills the requirements of EN 50021 or at least IP54 according to EN 60529.

EXPLOSION HAZARD: DO NOT CONNECT OR DISCONNECT EQUIPMENT UNLESS AREA IS KNOWN TO BE NONHAZARDOUS.

Note

The specified approvals apply only when the corresponding mark is printed on the product.

FCC Approval

This device complies with Part 15 of the FCC Rules and with RSS-210 of Industry Canada.

Operation is subject to the following two conditions:
(1) this device may not cause harmful interference, and
(2) this device must accept any interference received, including interference that may cause undesired operation.

Notice

Changes or modifications made to this equipment not expressly approved by SIEMENS may void the FCC authorization to operate this equipment.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

Consult the dealer or an experienced radio/TV technician for help.

Notice

FCC Radiation Exposure Statement:
This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator and your body.

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

National Approvals

The product SCALANCE W744-1PRO is approved in the following countries:

Country	Mark	5.15 - 5.25 GHz 4 channels IEEE 802.11a	5.725 - 5.850 GHz 4 / 5 channels IEEE 802.11a	2.4 - 2.4835 GHz 11/13/14 channels IEEE 802.11b/g
Austria	CE 0682 !	Indoor only		•.
Australia		Indoor only	•	•
Belgium 1)	CE 0682 !	Indoor only		•
Canada		Indoor only	•	•
Switzerland	CE 0682 !	Indoor only		•
Chile			Indoor only	Indoor only
Czech Republic 2)		Indoor only		•
Germany 3)	CE 0682 !	Indoor only		•
Denmark 4)	CE 0682 !	Indoor only		•
Spain	CE 0682 !	Indoor only		Indoor only
Finland	CE 0682 !	Indoor only		•
France; 5)	CE 0682 !	Indoor only		•
Greece	CE 0682 !	Indoor only		
Great Britain	CE 0682 !	Indoor only		•
Hong Kong		•	•	•
Hungary		Indoor only		•
Ireland 6)	CE 0682 !	Indoor only		•
Iceland		Indoor only		•
Italy 7)	CE 0682 !	Indoor only		•

Country	Mark	5.15 - 5.25 GHz 4 channels IEEE 802.11a	5.725 - 5.850 GHz 4 / 5 channels IEEE 802.11a	2.4 - 2.4835 GHz 11/13/14 channels IEEE 802.11b/g
Japan 8)		Indoor only		●
Korea			●	●
Kuwait				802.11b
Liechtenstein	CE 0682 !	Indoor only		●
Luxembourg 9)	CE 0682 !	Indoor only		●
Netherlands	CE 0682 !	Indoor only		●
Norway	CE 0682 !	Indoor only		●
Portugal 10)	CE 0682 !	Indoor only		●
Sweden	CE 0682 !	Indoor only		●
Singapore		●	●	●
Turkey		Indoor only		●
United States of America	FC	Indoor only	●	●
South Africa		Indoor only	●	●

1) 5 GHz indoor use only, max. transmitting power 60 mW
2) 5 GHz indoor use only
3) Radio stations and systems operated by private users (IMS-status) in Germany are only allowed to work within the frequency bandwidth if regulation 35/2002 is fully complied with.
4) 5 GHz max. transmitting power 50 mW
5) 2,4/5 GHz only indoor use
6), 7) und 10) 5 GHz max. transmitting power 30 mW
8) Systems operation and frequency allocation in the 5GHz-band, except for DFS, is allowed only for the client SCALANCE W744.
SCALANCE W788 is released only to work in the 2.4GHz-band (IMS-frequency).
9) Within the range 5,15-5,35 GHz, 60 mW EIRP are allowed..

Appendix
Private MIB Variables of the SCALANCE W744

Downloading the MIB from the SCALANCE W744

If you have not yet logged on, the URL http://<IP address>/snScalanceW.mib, displays the login window where you can gain access to the private MIB of the SCALANCE W by logging on. To save this, go to the source text view and save it as *.mib on your PC.

OID

The private MIB variables of the SCALANCE W744 have the following object identifiers:

```
iso(1).org(3).dod(6).internet(1).private(4).
  enterprises(1).ad(4196).adProductMibs(1).simaticNet(1).
  iScalanceW(4)
```

Variables

The following table shows the private MIB variables of the SCALANCE W744:

Name	OID	Description	Number of Objects
snDownload	1.3.6.1.4.1.4196.1.1.4.100.1.5	Download information and control variables for image, configuration file, events table.	15
snNvLog	1.3.6.1.4.1.4196.1.1.4.100.1.6	Log for events.	8
snTrapInfo	1.3.6.1.4.1.4196.1.1.4.100.1.7	Information on traps.	6
snGen	1.3.6.1.4.1.4196.1.1.4.100.1.8	General information, not conforming with MIB-2.	22
snTcpip	1.3.6.1.4.1.4196.1.1.4.100.1.10	IP address, Subnet mask, Default gateway, DHCP status…	5
snScalanceWCommon	1.3.6.1.4.1.4196.1.1.4.100.2.1	SCALANCE W - specific settings.	24
snScalanceWFilter	1.3.6.1.4.1.4196.1.1.4.100.2.4	Protocol filters and storm threshold settings	18
snScalanceWStats	1.3.6.1.4.1.4196.1.1.4.100.2.5	Information on WLAN 1 and WLAN 2 interfaces.	62
snScalanceWClients	1.3.6.1.4.1.4196.1.1.4.100.2.6	AP mode: List of all clients currently "associated“ or connected and information on them. Client mode: The list of devices to which the client is currently connected.	56
snScalanceWScan	1.3.6.1.4.1.4196.1.1.4.100.2.7	Client mode: The list of reachable WLANs and whether they are obtainable.	11

Traps

Name	Specific Index	Variables	Description
snScalanceWPower-LineDown	31	snScalanceWChangedPower-Line - The power line where the last power down occurred. 1-M12, 2-Ethernet Power	This is generated if there is a power down on M12 or the E-thernet power connector.
snScalanceWPower-LineUp	32	snScalanceWChangedPower-Line - The power line where the last power up occurred. 1-M12, 2-Ethernet Power	This is generated at the power up at M12 or Ethernet power connector
snScalanceWFault	41	snScalanceWFaultValue - Fault value: 0 = no fault, bit 0 = power M12 is off, bit 1 = link down, bit 2 = internal error, bit 19 = Link Check error, bit 20 = IP Alive broken, bit 21 = power ethernet is off, bit 22 = Cold/warm start, bit 23 = C-PLUG error, bit 24 = iQoS error, bit 25 = Redundancy error"	This is generated if the snScalanceWFaultValue vari-able is changed.
snScalanceWIQOS	51	snScalanceWIQOSValue - De-scription of the last snSca-lanceWIQOS trap	
snScalanceWLink-CheckOff	81	snScalanceWLinkCheckValue - Description of the last snSca-lanceWLinkCheckOff Trap	This is generated if a timeout occurs with a client monitored with Link Check.
snScalanceWLinkIn-tegrityOn	82	snScalanceWLinkCheckValue - Description of the last snSca-lanceWLinkCheckOn trap	This is generated if a client mo-nitored with Link Check logs on again at the AP following a ti-meout.
snScalanceWClien-tAuthenticated	85	SnScalanceWClientsIndex - An index of the client in the snSca-lanceWClients table	This is generated when a client logs on at the AP.
snScalanceWClient-DeAuthenticated	86	SnScalanceWClientsIndex - An index of the client in the snSca-lanceWClients table	This is generated when a client logs off from the AP.
snScalanceWRedun-dancy	53	SnScalanceWRedundancy-Value- Description of the last redundancy trap. SnScalanceWRedundancyS-tate- Status of redundancy con-nection	This is generated if the status of the redundant connection chan-ges, for example when the con-nection of wireless interface A aborts.

Glossary

ACL	Access Control List with MAC addresses with the right to access the wireless network
Ad hoc network	Wireless network between individual devices (point-to-point)
AES	**A**dvanced **E**ncryption **S**tandard, Encryption according to the Rijndael algorithm.
EAP	Extensive Authentification Protocol. Authentication protocol.
Hidden node problem	Two nodes are arranged in a wireless cell so that they are outside their own transmission range. If they both access the medium at the same time, collisions result.
IEEE	Institute of Electrical and Electronics Engineers
IEEE 802.11	Standard for wireless networks in the 2.4 GHz range with transmission rates of up to 2 Mbps.
IEEE 802.11a	Standard for wireless networks in the 5 GHz range with transmission rates of up to 54 Mbps.
IEEE 802.11b	Standard for wireless networks in the 2.4 GHz range with transmission rates of up to 11 Mbps.
IEEE 802.11g	Standard for wireless networks in the 2.4 GHz range with transmission rates of up to 54 Mbps.
IEEE 802.11h	The IEEE 802.11a standard expanded by TPC and DFS.

IEEE 802.1x	The heart of the standard is the use of a Radius server as the authentication server. In addition to this, in IEEE 802.1x, the entire communication is encrypted.
RADIUS	Remote Authentication Dial - In User Service for secure communication networks
Roaming	Free movement of wireless LAN nodes even beyond the boundaries of an access point's cell. The nodes and can move from one cell to the next without any noticeable interruption.
RTS/CTS	Request to send/Clear to send. Scheme for avoidance of collisions.
SNMP	Simple Network Management Protocol. Standardized protocol for transporting network management information.
TKIP	Temporal Key Integrity Protocol. Scheme for cyclic changing of keys in WLANs.
WBM	Web Based Management. HTTP-based configuration method in which an HTTP server is used in the SCALANCE W744.
WDS	Wireless Distribution System. Radio links for connecting the access points for an extended service set (ESS)
WEP	WEP (**W**ired **E**quivalence **P**rivacy) is an optional part of the IEEE 802.11 standard. WEP specifies methods of authentication and encryption working with fixed keys stored on the device. All devices that want to access a network in which WEP is used must first be supplied with the same keys. The keys can only be changed manually.
Wi-Fi	Wireless Fidelity. Specification for wireless networks.
WPA	WPA (Wi-Fi Protected Access) is a method specified by the Wi-Fi Alliance to close security gaps in WEP. Authentication using a server is stipulated (802.1x). The dynamic exchange of keys at each frame introduces further security. The type of encryption can be TKIP or AES.

WPA-PSK WPA-PSK is a weakened form of WPA. In this method, authentication is not established by a server but is based on a password. This password must be configured manually on the client and server. Wherever possible, you should change to the WPA method to achieve greater security.

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